VOLUME XCVII NUMBER SIX

THE NATIONAL GEOGRAPHIC MAGAZINE

JUNE, 1950

Map of Northwestern United States and Neighboring Canadian Provinces

Sixty-four Pages of Illustrations in Color

PUBLISHED BY THE
NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, D. C.

$5.00 A YEAR 50c THE COPY

Vol. XCVII, No. 6 WASHINGTON June, 1950

THE NATIONAL GEOGRAPHIC MAGAZINE

Montana, Shining Mountain Treasureland

By Leo A. Borah

SPACIOUS, vigorous, free and easy, Montana remains the storybook West, embellished but not spoiled by modern development.

It is so close to its beginnings that some of its pioneer settlers are still living. In their childhood buffalo hordes instead of the blooded cattle of today roamed its rolling eastern plains, and Indians strove to drive the white man from their favorite hunting ground by attacking immigrants' ox-drawn wagon trains and by scalping prospectors panning gold along its western mountain streams.

Less than three-quarters of a century ago, June 25, 1876, Custer made his last stand against the Sioux on the Little Bighorn near the place where the town of Hardin now stands, 55 miles southeast of Billings.

The last major campaign of United States troops against the Indians ended on October 5, 1877, north of the Bearpaw Mountains, a few miles from the sites of Chinook and Havre. That day the magnificent Nez Percé Chief Joseph surrendered to Col. Nelson A. Miles after a masterly retreat of 1,600 miles in Idaho, Wyoming, and Montana toward Canada.

A Land of Wide-open Spaces

Nobody is crowded in Montana. With little more than a half-million population, the State has an area of 147,138 square miles—about 180 acres for each person. It measures 545 miles from east to west, 320 miles from north to south, and more than two miles up and down, its lowest elevation 1,800 feet and its highest 12,850. In area third in the Union, it ranks thirty-ninth in population.

So far as is known, the first white men to set foot on Montana soil were the sons of Pierre de la Vérendrye, who visited its eastern plains briefly in January, 1743. They may have sighted the Bighorn Mountains, for their record calls the area the "Land of Shining Mountains."

Lewis and Clark crossed it going and returning on their epic journey to the Pacific, 1805–6, and brought back such enthusiastic reports of its myriad wild animals that it became a mecca for hunters and trappers.

The discovery of gold in commercial quantities in 1862 brought a stampede of miners, but it was not until May 26, 1864, that Montana became a separate Territory. November 8, 1889, it attained statehood.

The Commonwealth that was lawless wilderness 85 years ago is aptly nicknamed the "Treasure State." Beneath its mountains still lies untold mineral wealth, though its mines have already disgorged billions of dollars.

Its farm lands, both nonirrigated and irrigated, produce stupendous yields of wheat, hay, sugar beets, and other crops (pages 722 and 727). Over its grassy hills and plains range thousands of fine cattle, sheep, horses, and hogs. Agriculture has gone far ahead of even mining in money income.

From 25 million acres of forest lumbermen reap rich harvest (page 707). Oil, now produced in many fields, is a source of profit rapidly attaining major development, and natural gas is plentiful in much of the State. In numerous rushing rivers roars unlimited water power.

Glacier National Park, three entrances to Yellowstone, scores of dude ranches, and nine primitive areas invite the Nature lover and sportsman (pages 712 and 728). Annually Montana entertains more than two million visitors. Recreation has become big business.

To begin a trip that was to take me over 6,000 miles of Montana highways and byways,

Ernest C. Peterson

For Bruising Sport, Try Bulldogging a Runaway Steer

Overtaking the steer, the rider leaps from his horse, seizes the horns, digs high heels into the ground and wrestles the animal to earth. The entire action, from the opening of the corral gate to the instant the steer is helpless, is accomplished in seconds. Most Montana towns conduct annual rodeos.

I got off the Milwaukee streamliner *Olympian Hiawatha* at Roundup one day last August.

Roundup, as its name implies, began as a cow town when great herds of stock grazed the open range. With the coming of homesteaders, in 1910, however, the cattle were fenced in. The county-seat town is now a coal-mining center.

Coal Enough for Centuries

According to U. S. Geological Survey estimates, Montana has coal reserves of about 222 billion tons. Much of this, of course, is lignite and subbituminous, too low in heating power and too high in ash content for economical use in industry, but, easy to mine, it holds bright promise for synthetic liquid fuel.

In Roundup I met versatile Bob Fletcher, who seems to know personally most of the people in Montana.

As plans and traffic engineer for the State Highway Commission several years ago, he wrote whimsical legends for the historical markers which add to the pleasure of motorists on 5,000 miles of paved highways. He and I set out together toward the Beartooth Range on the northern border of Yellowstone National Park.

As we drove out of Roundup on a smooth-surfaced road that goes through a gap in the low, massive Bull Mountains to Billings, we were in the wide-open spaces. The August day was hot and sunny, the air so clear that mountains 50 miles away seemed almost at hand. Here and there we passed ranches and herds of cattle or sighted in the distance a coal-mining operation, but we saw few human habitations. Bob pointed out several antelope on a far-off hillside.

At Billings we went up to the summit of the rimrock for a bird's-eye view of the thriving, fast-growing city and miles upon miles of the fertile, widely irrigated Yellowstone Valley.

Eliot C. Prince

Vacationtime Cowgirl Tries a $500 Saddle in a Miles City Shop

Miles City, a Montana cattle center, offers saddles costing from a few hundred dollars to thousands. Some expensive models are jeweled. Frames and leather parts are wrought by hand. Many working cowboys, rodeo riders, and movie players have saddles made to order.

On a promontory 400 feet above the valley we paused to read the inscription burned on one of Bob's rustic historical markers:

> In frontier days the average party's demise was plumb abrupt and his interment more or less informal. The pioneers, being a vigorous breed, and tough as whang leather, were hard to kill with a 45-90 slug, let alone usual maladies. They regarded pestilence as trivial, and lingering illness due to the ravaging bite of such nefarious critters as microbes and bacilli was practically unknown. So when a gent was called he usually left in a cloud of smoke.
>
> Obsequies were sincere but simple. Whatever eclat they lacked was largely due to shortage of facilities such as pipe organs and rubber tired hacks.
>
> Because of the occupants' habit of fading out in their moccasins, this necropolis has long been known as Boothill Cemetery.

"The site of Billings used to be a favorite camping ground of the Crow Indians," Bob told me. "This trail is named for their Chief Black Otter."

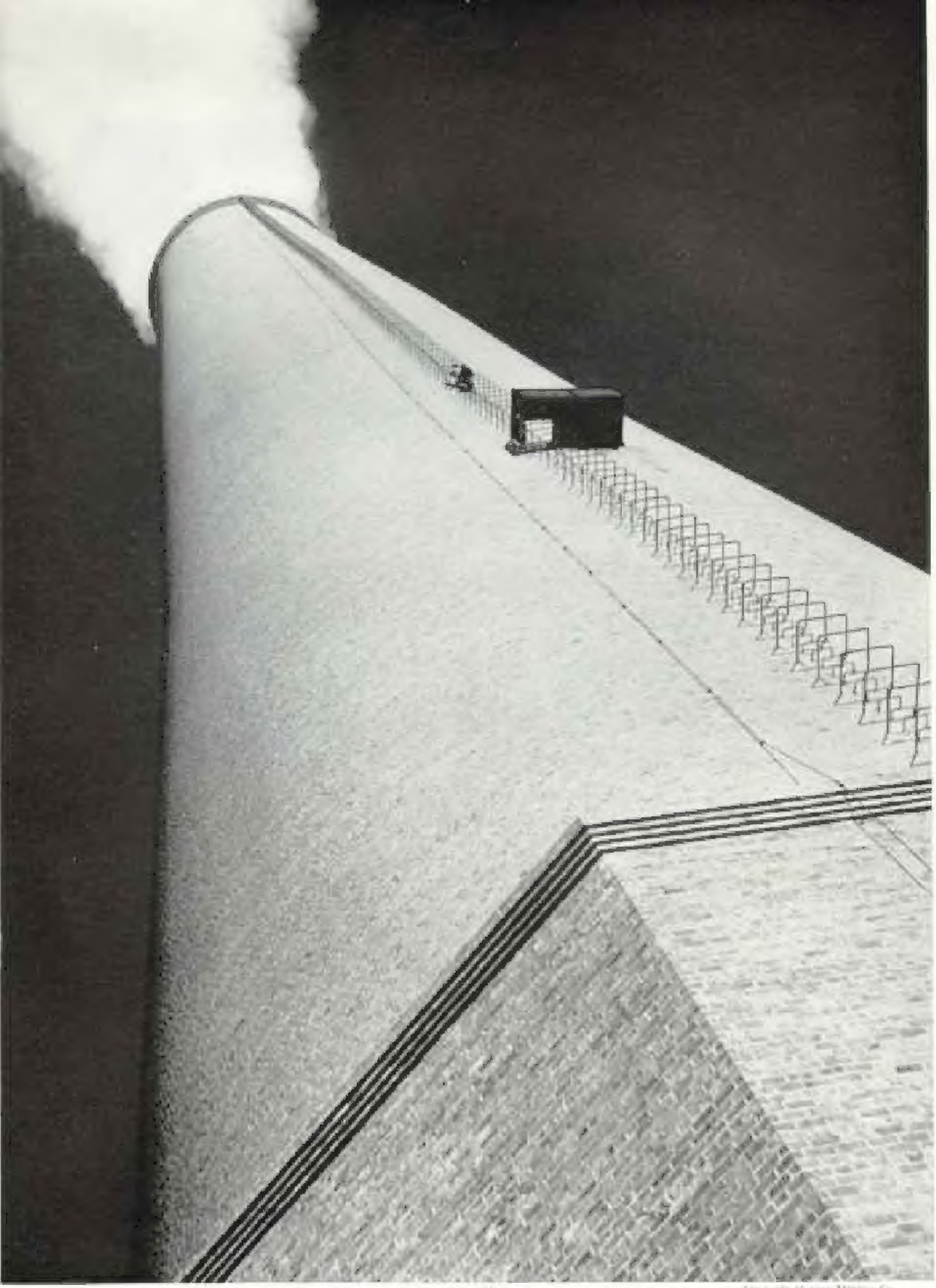
Billings, named for a onetime president of the Northern Pacific, was a rough little cow town of 836 population in 1890. Today, seat of the Eastern Montana College of Education and a booming industrial center, it boasts some 35,000 urban dwellers. Its trade area, embracing the irrigated valleys of the Yellowstone and Musselshell Rivers, is almost as large as the State of Pennsylvania.

Irrigation Has Made Desert a Garden

Since the early days irrigation has been the basis of Billings' prosperity. The first ditch was dug in 1882, and now it is estimated that there are 769,000 irrigated acres in the region of which Billings is the market center.

In 1906 a refinery was built in Billings to produce beet sugar. Beets from 27,000 acres are now processed in this plant, the largest of its kind east of the Rocky Mountains.

In the last decade the handling of crude oil has become a big industry in Billings. Two recently completed refineries are in full oper-



Anaconda Copper Mining Co.

World's Largest Smokestack Carries Off Fumes from Anaconda Copper Smelters

This brick chimney soars 585 feet (page 209). At scheduled intervals inspectors climb the steel ladder to the top. In a stiff wind, they say, they can feel the great column swaying.

ation, with an annual production of more than 50 million dollars.

As in the days when the Yellowstone Basin was untilled grassland, Billings still is in the livestock business. Working cowboys, wearing "ten-gallon" hats and high-heeled boots, but easily distinguishable from dude visitors affecting similar garb (page 699), mingle with the crowds on the streets.

Newspapermen from all over the State were gathered in Red Lodge for the 64th annual meeting of the Montana State Press Association.

Journalism in Montana has a dramatic past. The first real newspaper, the Republican weekly *Montana Post*, was started in Virginia City in 1864 by two adventurers who brought their equipment from St. Louis to Fort Benton by steamboat, hauled it with ox teams to the booming gold camp, and set it up in a cellar under a cabin.

When the opening issue came off the press, its 960 copies sold quickly for 50 cents each in gold dust. The partners printed just two issues and sold out for $3,000, but the paper went on until 1869.

In the 1890's, when the rival copper kings Marcus Daly and William Andrews Clark were fighting for supremacy, each owned or controlled influential publications throughout the State. Daly's personal organ was the *Anaconda Standard*, Clark's the *Butte Miner*.

Early Editors Used Harsh Epithets

With utter disregard of libel laws, the editors battled hammer and tongs. Daly backed Anaconda for the State capital; Clark, Helena. A Clark paper, the *Missoulian*, charged that Daly forces were hiring Pinkerton detectives to register voters for Anaconda illegally. The *Montana Silverite*, the Daly supporter in Missoula, retorted by calling Helena "Her Hogocracy of Last Chance Gulch."

Montana now has 113 newspapers, 17 of them dailies, but editorial blunderbusses are no longer fired. At the Red Lodge meeting the editors fraternized happily, exchanging ideas on ways to improve their papers.

Red Lodge, at the foot of the Beartooth Range, grew up as a coal-mining town, but since completion by the Federal Government of the $2,755,000 Red Lodge-Cooke Highway it has become a summer resort.

While our newspaper friends were in business session, Bob and I drove 70 miles over the safe, paved road to the Silver Gate entrance to Yellowstone Park and back.

The ride was one of the most thrilling in my experience. Not far from the town the road enters narrow Rock Creek Canyon and ascends steeply between sheer cliffs into Custer National Forest.

Thence by four tremendous switchbacks it rises in 16 miles to an altitude of 10,942 feet, well above timber line. Great peaks rear skyward in every direction, some heavily forested, some crowned with eternal snow.

At Beartooth summit on the Wyoming side of the ridge we looked toward the northwest to see 12,850-foot Granite Peak, highest mountain in Montana, thrusting its snowy crest above clouds. Below and all around our eyrie spread out a glorious panorama of forest, lakes, mountains, and plateau meadows, dappled here and there by fleeting shadows as small clouds drifted across the sun. I marveled to think as I gazed over the seemingly impassable terrain that Chief Joseph and his little band had gone through it in their famous retreat.

Early the next morning we went back to Billings, intending to engage rooms there for the night and make a trip to the Custer Battlefield. Billings and Salt Lake City baseball teams were to play a championship game that night, however, and every lodging place in town was overcrowded. We headed west.

A "Saddle and Go" Horse Race

At the fair grounds in Big Timber cowboys, riding ranch horses, were competing in a novel "Saddle and Go" contest, changing mounts three times in the course of a race. After every round of the half-mile track each rider would take the saddle off his mount, put it on the next one, and dash away in a cloud of dust. A young Indian from a dude ranch won the opening race in record time.

Near Big Timber at the foot of the Crazy Mountains the first dude ranch in Montana was started about 40 years ago. That was the beginning of a resort business that, now statewide, attracts thousands of summer vacationists.

In the early days of water-power development, Big Timber electric lights were operated by power from a dam built across a small ditch connected with the Boulder River.

A circus came to town one day and pitched its tents near the ditch. That evening the circus tents were well lighted with gasoline flares, but all the electric lights in the town flickered and went out. The circus elephant, taking a bath in the power ditch, had blocked out the water.

Nothing like that could happen today, thanks to the 12 plants of the Montana Power Company, and some installations of the Montana-Dakota Utilities Company. All Montana is furnished with abundant electricity.

U. S. Army, Official

Fort Peck Dam, Which Plugs the Missouri River, Is Crowned by a Brilliantly Lighted Highway 50 to 100 Feet Wide

This earthen dam, largest of its kind in the world, rises a maximum 250 feet and spreads out 4,900 feet at the base (page 733). It is 21,026 feet long. Four mile-long diversion tunnels are controlled by machinery in buildings on the left. Its generators can produce 50,000 kilowatts.

Ray J. Mosier from Western Wide

Combines, Sailing a Golden Sea of Wheat, Leave 18-foot Wakes on the Vast Campbell Farm near Hardin

Northern Pacific Railway

An Eastern "Dudine" Gets the Western Look

As a ranch hand adjusts her chaps, the visitor fancies herself a real cowgirl. How she will feel after she has been in the saddle a few hours depends on how much riding she has done previously.

Will Dyke from Great Northern Railway

"How Do You Talk with Sign Language?"

A boy from the East gets a lesson in Indian conversation from one of the Blackfeet who greet visitors at Glacier Park station (page 708). In the Plains Museum at Browning are displayed relics of the warlike Blackfeet.

Even the demands of war at its peak did not necessitate a brownout, and excess power was transmitted to Utah, Idaho, and eastern Washington.

When we reached Livingston, we were held up for ten minutes by a saddle-club parade. Livingston is the outfitting point for a vast recreation area and for travelers bound for Yellowstone National Park by way of the Livingston-Gardiner route.

All about Livingston mountains hem in the highway—the Absarokas, the tall Crazy Mountains, and the Bridger Range, named for the most famous of pioneer guides. John M. Bozeman, who vied with Jim Bridger in a race to prove a short-cut trail to Virginia City in the 1860's, was killed by Indians a few miles east of Livingston. His body now rests in the city that bears his name.

At Bozeman is Montana State College, oldest active unit of the University of Montana. The campus of 95 acres accommodates the college, a field office of the U. S. Bureau of Entomology and Plant Quarantine, the Agricultural Extension Service, and the State Agricultural Experiment Station.

Like Livingston, Bozeman is a recreation center (p. 704). The Bozeman-Gallatin Canyon route is one of the main roads to the West Yellowstone entrance to Yellowstone Park.

Where the Mighty Missouri River Begins

East of the town of Three Forks we made a short detour to the point where the Missouri River has its beginning. We scrambled up to a height from which we could see the Gallatin, Madison, and Jefferson Rivers meeting to form the Missouri.

In gathering dusk Bob and I rode into Butte, the unique city that copper has built on the slope of "the richest hill on earth" (page 703). That hill has yielded, since its discovery 80 years ago, about three billion dollars worth of metallic and nonmetallic minerals. On its surface are some 250 miles of streets, in its depths nine times as many miles of mine tunnels.

In May, 1864, miners from the Virginia City camp found placer gold along Silver Bow Creek (now Clark Fork) in the valley below the hill which has made Butte famous. A tent town sprang up quickly, only to fade into a ghost camp in 1869 when a water shortage put an end to the placer mining.

In 1875 William L. Farlin, an Idaho prospector, quietly staked claims on outcrops of quartz near the abandoned diggings. The black ledges proved rich in silver, and overnight Butte became a wild boom town, with claim jumping and pistol fights common.

W. A. Clark, Deer Lodge banker who later became U. S. Senator, built a stamp mill to handle the ore. The narrow-gauge Utah and Northern Railroad was constructed in 1881 to transport the silver ore to the main line of the Union Pacific at Ogden, Utah. Other railroads came later, the Northern Pacific, Great Northern, and Milwaukee.

Marcus Daly Built a Copper Empire

Attracted by the excitement, a young Irishman, Marcus Daly, came to Butte to work a silver mine for some Salt Lake City bankers. His operations were fairly successful for a while, but the owners lost interest when instead of silver he began to strike copper.

Though experts laughed at him, he borrowed money to develop the Anaconda mine and at 400 feet opened up a fabulously rich vein of copper 50 feet wide. That was the beginning of Butte as the capital of a copper empire and of a feud between Daly and Clark that had national repercussions.

Daly, two years before his death in 1900, sold out his interests for 30 million dollars. Clark died in 1925, one of the wealthiest men in the United States. Both he and Daly had started out with nothing.

Eager to see a copper operation from the beginning, I asked officials of the Anaconda Copper Mining Company to take me down into a mine. They suggested one of the regular visitors' sight-seeing trips, but I fatuously insisted on going with a work shift. A young mining engineer volunteered to conduct me.

Where gigantic steel headframes bristle above the numerous mine shafts, we entered a locker room in the office building of the Leonard mine.

There my companion stripped and put on work clothing. He got out a similar outfit for me, and I dutifully donned it—all save the long woolen underwear, the mere sight of which always makes my skin itch. I had a pair of thick wool socks, oversize overalls and jumper, and gum shoes so huge that my feet slid around in them when I walked.

To top off the ensemble, the supply clerk fitted on me a strong fiber helmet surmounted by an electric light from which a thick cord led to a battery firmly anchored to a wide belt around my waist. The cord was a bit short, and I couldn't turn my head without jerking the helmet awry. This difficulty I expected to overcome by turning on my heels when anybody spoke to me from behind or at the side.

The work shift was ready to go down in the four-decked elevator—capacity eight men to a deck. My companion was rather small,

Kodachrome by Rene Petersen

King of the Crags, a Rocky Mountain Goat Surveys His Montana Wilderness Domain

Some 4,000 of these acrobatic relatives of the antelope survive in high fastnesses of the Selway-Bitterroot Wilderness Area (above) and Glacier National Park. Incredibly sure-footed, they scale seemingly vertical cliffs.

Copper, the Metal That Made Montana Rich, Fittingly Sheathes the Dome of the State Capitol in Helena

[illegible] Territorial governor. A native of Ireland, he served as a general in the American Civil War

Brooks 'Richest Hill on Earth' Has Yielded Minerals Worth Nearly Three Billions, 2,281 Miles of Tunnels Honeycomb Its Depths

Brahma Bull Tosses His Rider at Derby Rodeo, Turned Clown Waves a Blanket in Mock Defiance

Below the New Gilmer Lift at West Yellowstone, Montana, Stretches out Lake Earth Seen from a Rocket

Flathead Lake, One of the Largest West of the Mississippi, Contains Big Bears to a Lumber Mill at Somers

▲ When Earth Wrinkled Eons Ago, Glacier Park Strata Buckled

[illegible]

▼ Blackfeet Indians in Tribal Regalia Sell Postcard Pictures of Themselves

When [illegible] Montana [illegible]

but our cage, the top one, was pretty tight with only seven passengers.

Doors clanged shut, a bell sounded, and down we dropped at breathless speed to the 3,100-foot level.

No Place for a Mollycoddle

There we got out, and a mine foreman with the agility of a mountain goat led us through a tunnel to the foot of a stope where a huge cascade of ore had just been blasted from the wall. The foreman swarmed up a ladder and I lumbered after him.

When I got to the top of the ladder, the foreman called out from somewhere behind me: "Come over here."

I planted my gum shoes precariously on the ore pile and inched around to see him ten feet away, astride a horizontal log that would have to be settled at rest of life and I.

Completely winded, I gasped, "I hate to be a mollycoddle, but I can't make it."

We climbed down to the tunnel floor, and after I had recovered my breath walked what seemed a mile to the foot of another stope. The going along the ore train tracks was uneven and a little slippery in spots, but I got along fairly well save when my helmet collided with the large canvas ventilation tube suspended from the tunnel roof. Once we hurried into a safety corner while a long train of ore cars rumbled by.

I climbed another ladder and, with the aid of my wooden gunny, clawed to the top of an ore pile. Men with pneumatic rock drills were working on the walls of the stope.

Back at the elevator station, a work shift was waiting to go up.

"Whew!" I said to the engineer when the elevator whisked back to the surface and we got out of the cage. "What a tough way to earn a living this mining is!"

The foreman bristled. "I like it; my father and grandfather both worked here and liked it. It's not hard after you get used to it."

With the embarrassed feeling that I had given the miners a good laugh, I clopped over to the supply room to surrender my territorial helmet.

There are 14 hoisting shafts on the Butte Hill and 30 shafts for ventilating and servicing the operating areas. To insure safety, all the mines are connected by underground passages, so in case of accident in any one of them the workers can walk to another and ascend to the surface.

Relieving men of much of the backbreaking toil of former years, power-driven scrapers and mucking machines are employed. The mines use 50,000 horsepower of electricity supplied by the Montana Power Company, a concern entirely independent of the Anaconda Copper Mining Company. Between the two the only connection is that the mines are the best customers of the power producers.

That night Bill, Mrs. Bleaher, and I went to the Italian settlement in Meaderville for dinner at "Teddy's" Rocky Mountain Cafe. The meal, perfectly cooked, and made particularly tempting by an array of unusual hors d'oeuvres, was a gourmet's delight. When my [illegible] I heard a guest at the next table ask a waiter, "What is that, a roast?"

Teddy came to this country from Dalmatia years ago as a penniless boy. He has lost two or three fortunes and has always come back to make another.

The next morning I went to Anaconda to see some of the ore I had watched mined in the Leonard go through the smelter.

Years ago when copper was smelted in Butte, the air all over the city was so thick with sulphur fumes from low-surface roasting and furnace chimneys that street lights had to be turned on in daytime, and not a spear of grass could live except under glass.

Now the smelters are located on a hilltop in Anaconda, 25 miles away, and the fumes from the furnaces are carried off with little harm to vegetation by the largest smokestack in the world, 585 feet high (page 696). Trees, grass, and flowers are gradually covering the once barren landscape in Butte.

Copper Ore Taken for a Ride

Superintendent Charles A. Lemmon showed me through the huge Anaconda Reduction Works.

At the top of the hill we watched steel cars full of ore tipped briskly so that their contents fell roaring into a hopper of 200-ton capacity. From a gigantic crusher below this the ore emerged in lumps not more than four inches in diameter. A second crusher, working like a coffee grinder, then reduced the four-inch pieces to one-inch diameter.

Now the small bits of ore went into churn like ball mills and a series of roller crushers which pulverized them to the fineness of flour.

By mechanical means the powdered ore, still 80 per cent waste, was carried into chutes of running water, called launders, to flotation machines where it was agitated and aerated with oils and chemical compounds.

This process seemed to me to make the law of gravitation operate upside down, for the heavier, valuable minerals, attracted by the oil and chemical mixtures, floated to the surface, and the lighter, waste material sank to the

bottom. The flotation equipment at Anaconda takes 14,600 tons of crushed ore for a ride every 24 hours.

Concentrated now to 20 per cent of its original volume, the powder went into roasting furnaces which burned off excess sulphur and other harmful elements, leaving calcine. The calcine, sent into reverberation furnaces emerged as matte, a mixture of copper, iron and sulphur, together with some traces of silver and gold. The slag from the reverberatory furnaces was thrown away.

At this point began the most spectacular operation I saw. The matte was heated to a fiery liquid in huge potlike axle-mounted converter furnaces and poured out as blister copper, 98 per cent pure.

Still containing small amounts of impurities, the copper was cleansed further in refining furnaces and finally cast into 740-pound anodes, rectangular slabs provided at the top corners with protruding ears needed for hanging them on parallel supports in electrolytic refining tanks.

The anodes were loaded into steel railway cars and hauled to the electrolytic copper refineries at Great Falls. They still contained small amounts of gold and silver to be removed during the electrolytic process.

Men Vie for Jobs in the Arsenic Plant

Zinc from the Butte mines as well as copper is processed at Anaconda, and one mill handles large quantities of arsenic, which is found with the metals. When Mr. Lennon showed me masked men working in the arsenic plant where the poisonous white powder coated everything, I was astounded.

"Isn't that a dangerous job? I [illegible] always have thought arsenic [illegible] the skin and eventually causes death to any person who is exposed to it constantly."

"These men all cover themselves with protective ointment," he replied. "They get extra pay, and there is a long waiting list for the jobs. So far as I know, none of them has ever suffered from arsenic poisoning."

"Butte mines provide not only arsenic but more than 95 percent of the domestic supply of manganese ore. We concentrate the pink-colored ore here, and the concentrates are roasted in a big rotary kiln to produce the high-grade manganese nodules vital to the production of steel."

After the trip through the Anaconda Reduction Works we had luncheon in the old Montana Hotel. A lounge there is furnished in the style of the gay nineties. Inlaid in the floor is a likeness of the head of Marcus Daly's race horse Tammany.

When Tammany ran, the miners, who had fanatic faith in the Irish copper king's luck, would bet on the horse every cent they could raise. Tammany seldom failed them.

A Land of Blood and Thunder

Leaving the copper country for a while, Bob and I drove south to Virginia City, heart of the district once famed as a land of gold. This is the cradle of Montana, a town with a history more melodramatic than a blood-curdling dime novel. State Senator Charles Bovey is restoring the old town, and once again it looks much as it did in the 1860's (page 232).

Rich placer deposits discovered about 1862 on Grasshopper Creek brought a stampede of prospectors bound originally for the Salmon River country in Idaho, and the town of Bannack sprang up with a population of 500 in a few days. Though for years Bannack has been a well-nigh effaced ghost town, it is remembered as the first capital of Montana Territory.

For almost a year Bannack was the most important placer camp east of the Continental Divide, but in May, 1863, it lost its supremacy and most of its population in one night. Intrepid William Fairweather and five companions had struck a bonanza in Alder Gulch, 55 miles distant!

Within a year there were 4,000 people in Alder Gulch. The community was organized and named first Varina for the wife of Jefferson Davis. A Republican judge, however, refused to certify the name and registered it as Virginia City.

In 1865 the Territorial capital was moved here from Bannack, to stay until it went finally to Helena in 1875. More than a hundred million dollars in gold was taken from Alder Gulch and vicinity.

The Sheriff Was the Robber Chief

Under the wily leadership of genial Henry Plummer, who had been elected sheriff at Bannack, a band of desperate outlaws terrorized the district for months, robbing stages of consignments of gold dust. These road agents murdered more than 100 persons.

Finally the honest citizens formed a vigilante organization. The vigilantes captured and hanged 28 of the miscreants, the false sheriff included, and drove out the rest. Five were hanged in one day at Virginia City. On Boot Hill Cemetery five markers were erected, each bearing merely a name and the one-word epitaph, "Hanged."

When a criminal was hanged, equipment was simple—a convenient tree or building

A Smoke Jumper Dropped from a Plane Parachutes into a Forest Fire

[illegible]

The Sight of Elk Moving Casually Across Hill and Snow Thrills Eastern Visitors. It's an Old Story to The'e Ranch Guide

Great Dam Puts the Mighty Missouri to Work; Its Prairie Hinterland Is Striped with Wide Farms

rafter, a lariat rope, and a barrel or a horse's back for a platform. One "Whisky Bill" Graves, on the loose end of a rope thrown over a high cottonwood limb and then attached to a rider's saddle horn, was seated forcibly behind the rider.

"Well, good-bye Bill," the rider called out, and set spurs to his mount.

Bob pointed out many places of interest in Virginia City, among them a famous claim called "Bummer Dan's Bar." Bummer Dan McFadden was a lazy fellow who lived on handouts in the boom camp until the miners grew weary of feeding him and ordered him to stake a claim and go to work.

When he complained that all the likely ground was taken, they showed him an open tract on the creek bank and made him start digging. Bummer Dan's bar turned out one of the most productive claims in the camp, yielding $3,000,000.

Even now there is some quartz mining near Virginia City, though the town has other means of income. Visitors who come to see the restoration are bringing on another boom. In the Wells Fargo Coffee House up the street from the old Bale of Hay Saloon, Bob and I were lucky to get reservations for a smorgasbord, really a colonial-type buffet supper, which seated 300 customers and turned away as many others.

"Cabaret" entertainment was supplied by a company of talented young players dressed in costumes of the gay nineties. Two or three nights a week they put on melodrama without any attempt at travesty.

Helena Began as "Last Chance Gulch"

Helena, Montana State capital, had its beginnings in Last Chance Gulch, a mining camp almost as riotous as Virginia City. Today Last Chance Gulch is Main Street, and the Montana Club building, which also houses the Chamber of Commerce, has on its wall a plaque marking the spot where the first gold strike was made.

Four discouraged prospectors who found a few "colors" in a creek here in 1864 thought at first the place was hardly worth investigating. Disgustedly dubbing it their last chance, they roamed all over the barren Prickly Pear Valley and equally desolate surrounding hills in search of more promising ground. They found nothing good, however, and in desperation returned. The strike they made was one of the richest in history.

The old-timers' expression, "There's gold in them thar hills," is still true in Helena. A Spokane company recovered thousands of dollars only two years ago by operating a dredge near town, and during depression years men digging for gold with picks and shovels in vacant lots within the city limits eked out a living.

When the Placer Hotel was built, the contractor recovered enough gold from the basement excavation to pay for the foundation—some say for the whole structure.

Stories of fabulous early-day strikes in the district are legion. Here Tommy Cruse, a ragged Irish immigrant, prospected in the hills for nine luckless years, often begging money to buy food. At last in 1876 a grocer and some schoolteachers grubstaked him, and he found and named for his home in Ireland the incredibly rich Drumlummon mine.

Now the lush days of mining are over, and Helena depends upon cattle and sheep raising, agriculture, hydroelectric power, and manufacturing for most of its income. A magnificent new building houses the Federal Reserve Branch Bank.

Silver Dollars Cause a Bank Emergency

In Montana dollar bills are seldom seen; change from a $5 note offered in the purchase of a 10-cent article being invariably 90 cents in small coins and four silver dollars. The president of the Federal Reserve Branch Bank told me why.

"Montana is a silver State," he said, "and the citizens like silver money. We handle 200,000 silver dollars in this bank every week, and they come in bags holding a thousand each and weighing 64 pounds.

"During the war most of our men clerks were away in the services, and girls had a terrible time handling the silver. Every bag has to be lifted eight times after it is delivered from the mint.

"I appealed to the public to use paper dollars during the emergency.

"The only result I got from my posters was sharp criticism. Some critics even went up and down the State campaigning against me with charges that I was trying to demonetize silver."

Next to mining, the production of livestock is the oldest industry in Montana. Cattle were introduced to the Bitterroot Valley in the 1840's, and after the opening of the famous Chisholm Trail to Kansas in the late 1860's hundreds of thousands of Texas longhorns were trailed into Montana by cowboys. Sheep were brought in about the same time.

On January 1, 1950, there were in Montana 1,[illegible]1,000 cattle valued at more than 221 million dollars (page 724); 1,735,000 sheep worth about 33 million; 153,000 horses; and 192,000 hogs. Total value of all livestock in the State

Mountaineers Using Jackhammer Crews Drill the Canyon Wall at Flaming Gorge Dam Site

[illegible]

was estimated by the U. S. Bureau of Agricultural Economics at $264,012,000.

From E. A. Phillips, secretary of the Montana Stockgrowers Association, I learned something of the history of the cattle business. The association was organized in Miles City in 1885 to provide united action in enforcing livestock laws, protect ranchers against organized bands of rustlers, and guard ranges against fires.

Miles City, named for Nelson A. Miles and still redolent of the Old West, came into being as a camp on the Texas trail within striking distance of the Black Hills gold camps. In the heart of a famous cattle country, it is a hearty survivor of cowboy days, renowned for its saddleries (page 695).

Old Fort Keogh, up the Yellowstone from Miles City, was established not long after the Battle of the Little Bighorn and named for Capt. Myles W. Keogh who died with Custer. Here for many years the U. S. Army maintained a famous remount station.

The beginnings of the Stockgrowers Association were in the days of the open range. Very active in the young organization was Theodore Roosevelt, who became a member on April 3, 1885. Cattle rustlers were raiding herds everywhere, and at a stock-growers' meeting in Miles City the future President characteristically urged armed action against the thieves.

In the mountains around Helena I saw flocks of thousands of sheep, mostly Hampshires and Rambouillets, which had been [illegible] up to high pastures for summer grazing. The herders take with them covered wagons equipped with everything necessary for living for months in the wilderness (page 726).

Much of Montana Government Owned

One of the difficult problems of the stockgrowers arises from the ever-increasing Federal ownership of land. The Federal Government now owns 37 per cent of all the land in Montana.

At the Capitol (page 702) I called on Montana's energetic Governor, John W. Bonner, a war veteran, who is keenly interested in the [illegible] state highway system. [illegible] in this land of far horizons, are built with funds raised by a State gasoline tax of six cents a gallon.

For the State Highway Commission the advertising director is young Albert Erickson, who later was my guide through the Bitterroot country. He and publicist William G. Ferguson helped me plan an itinerary.

A few miles north of Helena in the Missouri River canyon are the Gates of the Mountains—so named by Lewis and Clark, who came through them in 1805 on their trek from Great Falls toward the Pacific. I readily understood the explorers' reason for the name when some Helena men took me on a motorboat ride through the portals and back. Until our boat was almost at the Gates, I thought we were approaching a solid cliff hundreds of feet high. The apparently blank wall seemed to open as if by magic.

The highway from Helena to Great Falls follows the lovely canyon of the Missouri into strip-farming country where some of the finest hard spring wheat produced in America is grown without irrigation. The wheat is planted in cultivated strips 50 to 100 feet wide, alternated with equal strips of fallow ground. From an airplane the countryside for miles looks striped like a zebra (page 715).

Great Falls is the center of a veritable wheat empire. On the rolling hills also graze thousands of sleek white-face cattle and shaggy sheep. Oil from the rich fields around Cut Bank and Shelby is refined in a large modern plant, and the Anaconda Copper Mining Company operates here its electrolytic copper refineries, a big mill for making copper rods and wire, and an electrolytic zinc plant with a capacity of 29 million pounds a month. Natural gas is supplied from the Cut Bank fields.

Great Falls Still Defy River Navigation

From the turbulent falls of the Missouri four plants of the Montana Power Company draw more than 210,000 horsepower for use in Great Falls industry and for transmission out of the State. The first hydroelectric plant in Montana was installed at Black Eagle Falls in 1891.

Though the river here has been put to work, it is still just as impassable by boats as it was in 1805 when the Lewis and Clark Expedition toiled for 15 days to portage their gear around the falls and rapids. Navigation of the Missouri has never gone above Fort Benton, and may not get farther.

In a vast cement-floored tank house at the Great Falls electrolytic copper refineries I watched the copper anodes from Anaconda undergo final treatment. They were suspended by the ears on parallel wooden supports in 1,440 lead-lined concrete tanks filled with a solution of sulphuric acid containing 3.2 per cent copper as copper sulphate. In each tank hung 25 anodes interspersed with 26 cathodes—starting sheets of pure copper.

Electric current was passed through the tanks, and by electrolysis the copper was removed gradually from the anodes and deposited on the cathodes. When a cathode had

Lewis and Clark Cavern Is Columned and Festooned with Fantastic Limestone Architecture

[illegible]

Spring Blooming Glacier Lilies and Eternal Snows Are Hard to Reconcile in Glacier National Park

[illegible]

Giants of the Sun Road
In Glaciated Area, the
Seat of Garden Wall

Glacier Park Peaks Shine in the Mirror of St. Mary Lake

[illegible] St. Mary Lake [illegible] half a mile wide and [illegible] 2.3 miles long. St. Mary Lake [illegible] Lower St. Mary Lake.

Indians [illegible] the lake was known as Kootenai Pierre Jean. The Great Indian Reservation was created [illegible] in 1864. It included [illegible] the Lower [illegible] the home of the Blackfeet. Mount [illegible] gales at times churn the waters into whitecaps. [illegible]

According to the Park Service [illegible] of St. Mary and follows a beautiful northeast course for [illegible] miles.

At the Narrows, where the [illegible] the Lower [illegible] the motorist [illegible] of such peaks as Mahtotopa, Little Chief, Citadel, Gunsight, Fusillade, Reynolds, Heavy Runner, [illegible]

[illegible] Rose Valley, the [illegible] Divide Peak. [illegible] eminence flows to [illegible]—through the St. Mary River system to the [illegible] through the [illegible] Hudson Bay and the Arctic [illegible] through the Columbia [illegible] Pacific.

[illegible]

Hay in Bass Dale Dines Beneath Perfect Sky A Benvenuto Stacker Bales Is Lower Hoists the Crop

Kerr Dam Transforms Flathead River in a Nasty Temper

[illegible]

Kerr Dam [illegible] Flathead River [illegible] Little Bitterroot River [illegible] Dam [illegible] Flathead Lake [illegible]

Dam [illegible] Flathead River [illegible] [illegible] gulls.

[illegible]

Cowboys Drive Steak Cattle Through Upper Ruby Valley, Where Bison Roamed 75 Years Ago

As Long as Charles M. Russell's Paintings Endure, the Old West Will Never Be Forgotten

Grass Stands Deep on the Limitless Eastern Plains. Montana Ranks Third Among Wool-producing States

Spring Irrigation Supplying the Water Must Come from Deep Holes, McIntosh Sugar Beets near Corvallis

Bob Marshall Wilderness Area Entices Nature Lovers with the Lure of Lonesome Trails

[illegible]

This Is the Life in Montana. The Reward for Wading Hip-deep in Icy Rivers Is Supper Browning over a Campfire

The Thousand Head Bucks on National Issue Roan

[illegible]

Some of the Crow Indians Then Modern Houses in August, When They Give Their Fair. Tepees Dot the Reservation

Rook's Drugstore, as It Was in the '60s, Exhibits Merchandise of Virginia City's Gold-rush Days

reached a weight of about 170 pounds, it was removed and replaced by another.

I now discovered how the gold and silver are recovered from the copper. They sink to the bottom of the tanks in a silvery slime which is taken to a separate plant and dried and purified before going to final treatment in the gold and silver refinery.

From the electrolytic refinery Bob and I went to the rod and wire mill where we watched 300-pound bars of pure copper converted into wire (page 736).

Fort Peck, World's Largest Earthfill Dam

The biggest barrier to navigation on the Missouri was created not by Nature but by man. South of Glasgow, in northeast Montana, is the huge Fort Peck Dam started in 1933 by the United States Army Corps of Engineers and now virtually complete (page 698). It is the largest earthfill dam in the world, containing 125½ million cubic yards of earth, four million cubic yards of gravel, and a million cubic yards of rock.

When full, the artificial lake backed up by the dam will be 189 miles long and 16 miles wide, with a shore line of 1,600 miles.

The original purpose in building Fort Peck Dam was to control floodwaters in the Missouri River.*

Construction of the dam has cost the Government already more than 131 million dollars, and it is estimated that the cost after the proposed new power units are in place will have risen to $136,600,000.

At the damsite the Government has built the town of Fort Peck with a population of some 2,000.

One sparkling Saturday morning Al Erickson and I left Butte on a drive that was to take us through the glorious mountain country of western Montana. A smooth, hard-surfaced highway led us for a few miles south of Butte and then swung west into the Big Hole cattle country.

As we sped along the rollicking Big Hole River, which Lewis and Clark called the Wisdom, we frequently saw anglers knee-deep in the clear riffles whipping the stream for trout and grayling. Here is a fisherman's elysium (page 729).

The upper part of the Big Hole Basin is known as "the valley of ten thousand stacks," for it is hayland extraordinary. Everywhere along the stream we saw sleek Hereford cattle grazing knee-deep in lush grass, and dotted over the meadows to the blue horizon were mountainous haystacks.

We stopped briefly at McDowell's Spokane Ranch, which runs 3,500 cattle on a tract of 55,000 acres. The wide-spreading, one-story ranch house has picture windows framing distant mountains and the chuckling river. In an immense basement the owner has a motion-picture theater large enough to seat several hundred spectators.

He told us he rents films to entertain his hired hands and his neighbors. The house is heated with gas shipped to him in steel tanks, and every building on the ranch is lighted by electricity.

With characteristic mountain hospitality Mrs. McDowell asked us to stay for luncheon, offering to prepare it herself since the ranch cook had the day off. Reluctantly we told her we had to hurry on.

At Hamilton, in the irrigated Bitterroot Valley, we went through the United States Public Health Service Laboratory, where years of research developed a vaccine that affords a large measure of protection against dread Rocky Mountain spotted fever. Dr. C. R. Parker, since deceased, showed us how the [illegible] infected ticks. Supplying an enormous demand, the laboratory distributes the vaccine free of charge.

The First Religious Service in Montana

In the summer of 1840 Father De Smet held the first religious services in Montana. The following year the famous Jesuit who brought Christianity to the Indians of the Northwest returned and established St. Mary's Mission near what is now Stevensville. A large log cross was raised in the center of the valley. For this open-air cathedral stone-crowned St. Mary Peak was the steeple, the blue sky the dome.

Father De Smet brought to Montana not only religion but an economy entirely new to the Indians. Soon after his arrival he journeyed to Oregon and brought back seed wheat, oats, and potatoes.

The farmers obtained from Europe two 15-inch millstones and set up a flour mill. From old wagon wheel tires they hammered out axits for a sawmill.

[illegible] and I stayed overnight in [illegible] Florence Hotel. Missoula, [illegible] at the hub of fertile valleys, is the center of a rich agricultural district in which principal crops are wheat, oats, barley, and sugar beets. According to latest estimates, the metropolitan area has a population of 25,000.

The Montana State University is here, the

* See "Taming the Outlaw Missouri River," by Frederick Simpich, National Geographic Magazine, November, 1944.

Soon This Palomino Colt Will Wear a Brand

[illegible] the old West [illegible]

[illegible] up the Montana State University system administered by [illegible] the Montana State College at Bozeman, the Montana School of Mines at Butte, the Western Montana College of Education at Dillon, the Eastern Montana College of Education at Billings, and the Northern Montana College at Havre.

Smoke Jumpers Fight Forest Fires

On [illegible] of Missoula we visited Hale Flying Field, headquarters for fire-fighting activities of the United States Forest Service, Region 1. An intrepid corps of 150 "smoke jumpers" [illegible] to new [illegible] of [illegible] fires.

When a fire sighter [illegible] in the vast [illegible] the spotter reports its exact location as determined by triangulation of readings taken from several stations.* A [illegible] at Hale Field [illegible] fully [illegible] supplies and fire-fighting equipment [illegible] parachutes, with [illegible] in their [illegible] plates and in the air in 20 minutes at the most. Once they [illegible] 11 minutes after the [illegible]

[illegible] the ground [illegible] the [illegible] Jacko Valley and over a low divide into the Mission Valley. On the trip we passed St. Ignatius, founded by Fathers Joseph Minetrey and Adrian Hoecken, associates of Father De Smet.

We [illegible] the [illegible] the [illegible] brown [illegible]

[illegible] by Ella E. Clark, Missoula [illegible]

giant "Buck" Winters in the sprightly resort town of Polson, at the lower end of Flathead Lake. Flathead Lake, gleaming among cherry orchards, at the foot of the snow-crowned Mission Range, is one of the beauty spots of Montana (page 707).

Some miles from town we visited the superb Kerr Dam and power plant of the Montana Power Company, on the Flathead River (page 723). This dam has a generation capacity of 112,000 kilowatts of electricity and controls the water level of Flathead Lake between 10-foot limits.

Built at a cost of 12 million dollars, the dam is attended by the men of only eleven families living in a charming settlement near the foot of the spillway.

We drove up the east side of the lake through graceful cherry orchards and passed for the night at a rustic lodge at Big Fork on the northern end. The next day we were in the lively city of Kalispell, which has nearly doubled its population in the last ten years.

Here Phil Kingston who, though born and educated in England, has become an enthusiast for the romantic reaches of Northwest wilderness, took us to a mountaintop park from which we had an unobstructed view of 80 miles of matchless beauty. We could see the majestic peaks of Glacier National Park gleaming on the horizon.

Where Ski Championships Are Decided

In the afternoon we drove to the city of Whitefish and around Whitefish Lake, famous for fighting Mackinaw trout. A rocky road took us to the ski chalet on the shoulder of Big Mountain. Here in 1949 ski championships were decided on one of the most hair-raising runs in the United States.

To see a great lumber mill in operation we drove through heavy forest to Libby. About 15 per cent of the Christmas trees sold in the United States each year are cut in northwestern Montana, and the little town of Eureka has been dubbed the Christmas tree capital of the United States.

At the J. Neils Lumber Company in Libby we watched giant logs hauled by machinery out of log ponds and put through the mills. Some were peeled, creosoted, and made into poles for telephone lines. Others were sawed into finished lumber.

Of particular interest was one big mill where sawdust was compressed into "Prestologs," which burn cleaner and with more intense heat than coal. I watched thousands of these fireplace logs tumbling out of the machines which roll them into rock-hard, shining cylinders.

The next day we visited the site of the Snake fork of the Flathead River where the U. S. Bureau of Reclamation is building Hungry Horse Dam (page 715). The tremendous [illegible] was ready to start. On an observation platform hundreds of feet above the wide valley we listened to a broadcast telling about the proposed structure, which, it is estimated, will cost $108,800,000.

A large signboard near the cyne held the announcement that the dam is to be a development of Columbia Valley power. The Flathead River is a part of the system of streams that make the mighty Columbia.*

Tired from many days on the highways, I came toward evening to the west entrance to Glacier National Park. Peace seemed to flow around me from the glorious setting as superintendent J. W. Emmert took me through fragrant aisles of fir and spruce trees and along the still, darkling waters of Lake McDonald to the massive structure of rough-barked logs that is Lake McDonald Hotel.

I stayed in the park four nights, one in the Lake McDonald Hotel, two in the Many Glacier, and one in the Glacier Park. To see the thousand beauties of this unspoiled Eden, I should have had at least three weeks, for Glacier is a place for hikes and saddle trips. There are more than 1,000 miles of well-kept foot and horse trails leading to the great solitude where 60 glaciers have their source (pages 708 and 718).

Mr. Emmert showed me around as much as possible in four all too short days. One morning we drove on a rough wood road far up Lake McDonald to a small farm where a wild cow moose was wading near the sedgy shore.

We stood on the porch of a ranger station at another time and watched through binoculars a flock of Rocky Mountain sheep high on a meadow above timber line. On a boat ride and hike from Many Glacier we were lucky enough to spy five magnificent mountain goats leaping from crag to crag a thousand feet above us (page 701).

"Gertie," the Blond Bear, Back from Exile

Bears, of course, were everywhere, and the park visitors as always were disregarding warnings by feeding and even petting them. "Gertie," the blond bear who had been declared a nuisance, had been lured away to a distant game refuge a week before my arrival. To Mr. Emmert's amused disgust, she was back at her regular stand the day we drove

* See, in the National Geographic Magazine, "Dream Lands New Rakes," by Leo A. Borah, December 1949, and "Columbia Turns to the Power," by Maynard Owen Williams, June, 1941.

Red-hot Clipper Snakes Writhe in the Rod and Wire Mill at Great Falls

[illegible]

[illegible] Mr. Blossom and I had dinner at [illegible] Dieta we met [illegible] Director of Harvard [illegible] [illegible] Dieta [illegible] from the Wednesday world [illegible]

Leaving a "Land of Enchantment"

Reluctantly leaving this land of enchantment, I [illegible]

[illegible] Mexico [illegible] [illegible] sculptured [illegible] Mesa [illegible] [illegible] [illegible] [illegible]

The Vienna Treasures and Their Collectors

By John Walker

Chief Curator, National Gallery of Art

One of the most precious shipments of [illegible] touring America. It consists of paintings, sculpture, armor, tapestries, and jewels accumulated during four centuries by the Austrian Hapsburgs, and now the property of the Austrian Government.

These works of art have already been shown in many of the capitals of Europe and in Washington and New York (page 739). Before their return to Austria they will also be seen in San Francisco this summer and Chicago in the fall.

Their itinerary is the final stage in an art migration which began during the last war, when the contents of European museums were moved to salt mines, monasteries, bank vaults, and country houses, narrowly escaping war's destruction.

Peace brought out these buried masterpieces; but in many cases, like displaced persons, they returned to ruined homes. Such was the fate of the Austrian treasures. As a result, they are being enjoyed by hundreds of thousands of Americans, and 23 of the greatest paintings are reproduced in color with this article.*

Wars disseminate as well as destroy art. Centuries ago a comparable cargo crossed the ocean, traveling in the opposite direction. It was dispatched by Cortes after the conquest of Mexico.

"Fairer to See than Marvels"

This earliest of transatlantic art shipments journeyed to Europe in an armed galleon, a part of the Spanish fleet, then the most powerful afloat. Four centuries later the Hapsburg collections traveled to the New World in an air-conditioned refrigerator ship, a part of the United States Navy.

Between 1520 and 1521, Albrecht Dürer, the German painter, happened to be in the Netherlands when Montezuma's treasure arrived at the court of Charles V. Thus he saw history's first European exhibition of American art. He noted in his diary that these examples of pre-Columbian craft were "finer to see than marvels. I have never seen in all my days what so rejoiced my heart."

Four hundred years later, we might say the same of the first American exhibition of these treasures of European art once owned by Charles V and the Austrian Hapsburgs.

What makes the Austrian show so fascinating is that, though it comes from a public museum, the Kunsthistorisches Museum in Vienna, it is really an exhibition of the greatest of private collections. It reflects the acquisitive instincts of one family during a score of generations. The pictures decorated the walls of their palaces, the statues are their effigies, the rock crystals held the wine and water they drank. As recently as 1916, for example, the Burgundian court goblet now on display was used in the coronation of Emperor Charles as King of Hungary.

The collection has a character different from that of the usual agglomeration of museum objects. It suggests kingship rather than curatorship, and mirrors the disintegration of a dynasty but the survival of its taste.

Dürer Depicts Christian Martyrdom

The painting section opens with a work by Albrecht Dürer, who owed so much to Hapsburg patronage. It is a picture of the slaughter of 10,000 Christians (pages 760-761).

Once on panel but later transferred to canvas, Dürer's painting is the exhibition's sole representative of the great collection of early Flemish, German, and Austrian pictures in the Kunsthistorisches Museum.

Most of these works were painted on wood, which contracts and expands under varying conditions of temperature and humidity. Therefore panel paintings are most fragile and difficult to transport. Omitting them meant the omission of the unique Viennese collection of Pieter Bruegel the Elder, the saddest gap in the show.

Still, the exhibition, by concentrating on the High Renaissance and the 17th century, by focusing attention on the summits of Western painting, reflects the essential taste of the Hapsburg collectors, who themselves considered earlier art more interesting historically than stimulating esthetically.

For these monarchs the pillars of painting were Titian, Velazquez, and Rubens. As a result of their patronage, the collections of the Prado in Madrid, formed by the Spanish Hapsburgs, and of the Kunsthistorisches Museum in Vienna, formed by the Austrian Hapsburgs, have an unparalleled series of examples of the work of those three artists.

* For reproduction of German-owned paintings which should have escaped the war and be seen in America, see "Masterpieces on Tour," by Henry A. McBride, NATIONAL GEOGRAPHIC MAGAZINE, December, 1945.

Emperor Frederick III, Thus Bedecked, Presiding on a Charger at the Head of His Troops

[illegible]

America's Art Lovers Flock to See Treasures Once the Pride of Royal Connoisseurs

[illegible]

However, [illegible] outstanding collector [illegible] Rudolph II, [illegible] Rudolph [illegible] was [illegible] Like [illegible], he encouraged contemporary art and also purchased the work of earlier [illegible] His predecessor, Maximilian, [illegible] Prague, and it was his taste which [illegible] the [illegible]

Brought up by his uncle Philip II, Rudolph sought to make of his castle in Prague a treasure [illegible] space.

[illegible] connoisseur. He buried himself [illegible] glory for [illegible] known as the Hradschin.

Ambassadors waited for audiences sometimes for weeks, while Rudolph [illegible] artists and craftsmen. For them he [illegible] found money, though there were days when [illegible] because of lack of funds.

When Rudolph had acquired a new work of art, he would sit for hours in front of it and [illegible] passion for precious stones and rare metals [illegible] discovering the secret of the transmutation of chemical elements. His [illegible] the most marvelous jewelry in the world.

Living Dolls Painted by Sargy

Rudolph seems to have loved animals more than humans. He had beautiful white horses to admire but not to ride. Eagles and lions he tamed and kept in his rooms. When his two favorite lions died simultaneously, he was [illegible]

Rudolph [illegible] who

spent 11 years in his service. Savery achieved fame among ornithologists because he was, so far as we know, the only artist who ever painted a live dodo. Consequently, his "Landscape with birds" (page 751), where a dodo stares soulfully at an eel, has considerable scientific interest.

The emperor must have been pleased with this accurate portrayal of one of the last of a species. Indeed, there is a certain affinity between a bird soon to be extinct and Rudolph II, who was, in his gauche, neurotic way, an equally awkward creature, an equally outlandish survival of the past.

Like many of the Hapsburg rulers, Rudolph II was more successful as a collector than as an emperor. During his lifetime he accumulated works of art valued in the 17th century at 17,000,000 guilden, about $50,000,000, though in terms of the comparative purchasing power of money vastly more.

At the end of the Thirty Years' War, Swedes under Königsmark swept into Prague and looted the Hradschin. Even while peace was being concluded, Königsmark, the Swedish general, loaded barges with pictures and floated them down the Elbe to enrich the collection of his sovereign, Christina of Sweden.

Except by a few countries, including the United States, works of art have always been considered the spoils of battle. Recently the Russians, for instance, carried off the fabulous booty of the entire Dresden gallery, as well as much from the Berlin museums.

Titian 91 When He Painted Jacopo

Rudolph's renown as a collector was due in part to the services of an expert and art dealer, Jacopo de Strada. Titian has portrayed this shrewd antiquarian holding a statue of Venus tenderly, almost caressingly, its certificate of authenticity lying on the table, the coins from an earlier sale impressively displayed (page 744).

What an appraising, crafty glance this salesman gives his customer, perhaps the Emperor Rudolph himself! Here Titian has recorded the archetypal dealer, the universal purveyor of works of art, as he has plied his trade from the days of Pliny to the present time.

The portrait of Jacopo de Strada was painted when Titian was 91 years of age. The "Danae" (page 759) when he was 77, and Pope Paul III (page 764) when he was about 72. This was the period when the most distinguished of Venetian artists reached the summit of his genius.

In these late works of Titian, so richly represented in the exhibition, the reality of the paintings has the soft, indistinct beauty of colors remembered from a dream, and the contours have the wavering adumbrations of form apprehended with failing vision.

Though Jacopo de Strada was the expert and principal dealer for Rudolph II, his portrait was not bought by his patron. It was added to the Hapsburg collections by a cousin of Rudolph's, the Archduke Leopold Wilhelm, bishop of Olmütz, Passau, and Strassburg, Grand Master of the Teutonic Order and Governor of the Spanish Netherlands from 1646 to 1656.

This wealthy prince-cleric, who at the age of 15 held nine of the richest sinecures of the Church, was intended by his Imperial father, Ferdinand II, to be a military leader; but born connoisseurs rarely make brilliant commanders, and Leopold Wilhelm was no exception. He was notorious as the consistent loser of all the battles he fought.

The archduke was famous, however, as the shrewdest collector of his generation. Enriched by his governorship of the Spanish Netherlands, he owned 1,397 paintings, 437 drawings, and 542 pieces of sculpture, besides series of tapestry.

Leopold Wilhelm had the modern esthetic sense. Not for him those collector's items of his ancestors, curiosities such as the horn of a unicorn or that more exotic but no less undesirable object, at least for a museum, the jawbone of a mermaid. These relics he weeded out. His acquisitions were limited to art.

To help him assemble his collection, the archduke too had his experts. One of these was David Teniers, the painter, who not only advised on purchases but also provided his patron with copies of paintings in the archducal collection. These Leopold Wilhelm sent to Spain and elsewhere to arouse the envy of other collectors, much as privately printed catalogues and color reproductions are distributed today.

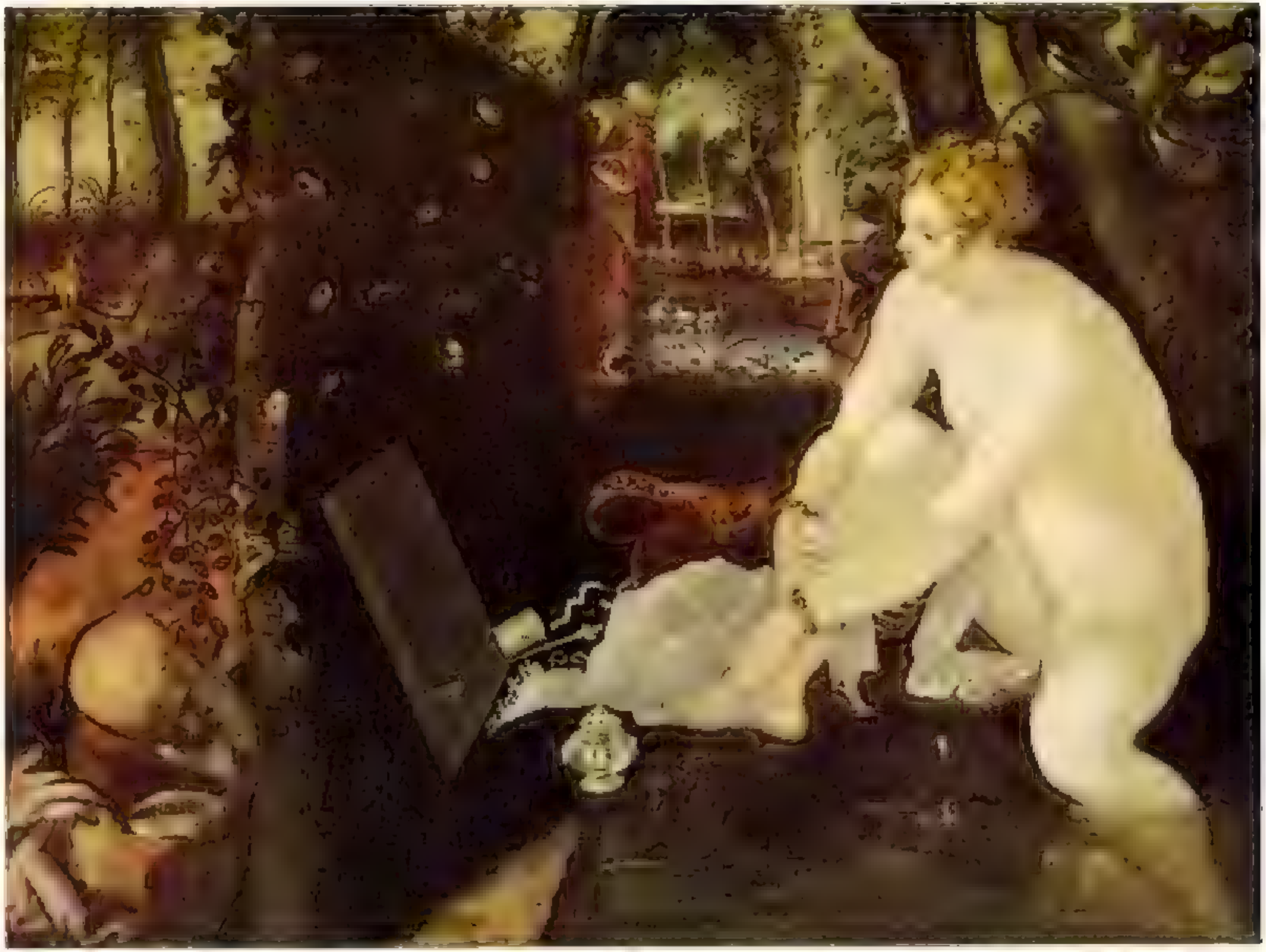
Courtly Life Sublimely Expressed

One of the most interesting paintings by Teniers is a view of the archduke's gallery with Teniers himself showing Leopold Wilhelm some recent acquisitions (page 752). The painting shows, hanging on the walls, eight canvases which are included in the present Austrian exhibition. Three of them are reproduced in this article (pages 744, 769, and 770).

As one can see from this view of his gallery, Leopold Wilhelm loved Italian art, which he had come to appreciate as a young man during his education at the Spanish court. He was charmed especially by Paolo Veronese. In the

[illegible] - The Vest on the Stairs

[illegible]



Jacopo Tintoretto (1518–1594) • Susannah and the Elders

PETER PAUL RUBENS [illegible] Paint. · The Four Continents

JAN STEEN pinxit Haag • *The World Upside Down*

[illegible] • The Forum of the Rome

canvases of this master of decorative painting, he found the ideal of courtly life sublimely expressed.

"Christ Healing the Woman with an Issue of Blood" seems less a demonstration of the miraculous than a lesson in gallantry (page 769). It shows a grand seigneur bestowing his favors on a beautiful supplicant, with all the actors in the scene masters of elegant gesture, models for the ceremonious manners of Leopold Wilhelm's court.

In the same artist's half-length of Lucretia (page 748), who points her dagger at her breast before committing suicide, how graceful is the heroine's gesture and how dignified her acceptance of her fate.

Tintoretto was another artist whom Leopold Wilhelm seems to have admired, especially for his portraiture.

The archduke liked paintings of heroic men of action, such as Tintoretto's "Man in Armor" (page 757), the type of self-confident warrior that the archduke was never able to be himself; or subtle pieces of characterization, such as his double portrait of an old man and a boy, perhaps a grandfather and a grandson, since they bear some family resemblance (page 763).

This painting, in its contrast of youth and age, is one of the most touching portraits executed by Tintoretto. The little old man, desiccated, wrinkled, bent, stares into space, absorbed in his memories. The boy beside him, in the first bloom of youth, stands erect, challenging the spectator and the world. The heartaches of the old man are almost ended, while the cares and anxieties of the boy are still to come; the old man seems wearily falling back into that childhood from which the youth has just emerged.

Radiant Womanhood and Rheumatic Age

The greatest of all the Tintorettos in the Vienna gallery, and one of the greatest paintings in the world, "Susannah and the Elders," would also have appealed to Leopold Wilhelm's discriminating taste; but either it was overlooked by his agents in Venice or they could not persuade its 17th-century owner, Nicolò Renier, to sell (page 742). Consequently, this canvas, so maliciously witty and so radiantly beautiful, did not enter the royal collections until a later date.

What mischievous observation there is in the old graybeard who peeks around the hedge, his stiff, rheumatic body in such violent foreshortening that we almost feel a twinge of muscular pain; and then Susannah, her nudity the one glowing passage in the composition, how magically Tintoretto has portrayed her opulent beauty, dowering her flesh with some mysterious incandescence!

The diagonal recession into the picture suggested by the figure of the old man, and the concentrated illumination falling on Susannah as from a hidden spotlight, contained all the elements that dominated Baroque design for the next hundred years.

Lorenzo Lotto's "Virgin and Child with Saints Catherine and James the Great" (page 771), which is first described in 1660 as being in the Imperial Collection, testifies to an interest in the more tranquil, dreamy phase of Venetian painting.

The type of composition is often known in Italian art as a *Sacra Conversazione*, or Holy Conversation, though the participants do not seem to speak so much as to suggest through glance and gesture a mood of tranquil communion.

During his governorship of the Netherlands, the court of Leopold Wilhelm swarmed with artists; at one time there were 65. The archduke, though he preferred the refinement of Italian art, was broad enough to appreciate the earthiness of Flemish painting. From a contemporary, Jacob Jordaens, he acquired "The Feast of the Bean" (page 747).

No repellent detail of this "proto-cocktail party" is spared, until one cannot but agree with the Latin text in the cartouche: "Nothing resembles insanity so much as drunkenness." Jordaens's canvas reaches the limit of grossness.

The coarseness of "The Feast of the Bean" seems out of key with the elegance of the other pictures in Leopold Wilhelm's collection. Among Flemish artists much more to his taste must have been Sir Anthony Van Dyck. In his canvases the compositions of Italian art appear in Northern dress.

Though the glow of Titian's palette has changed to a more somber scheme, so that dusty rose, ashen yellow, and dull green transform the golden radiance of Venetian color into a cinerous, almost sooty tone, nevertheless, canvases like "Samson and Delilah" (page 758) or "The Blessed Hermann Joseph Adoring the Virgin" (page 767) challenge the grand manner of the Venetian style.

Van Dyck portrayed a friend of Leopold Wilhelm, Rupert of the Palatinate, nephew of Charles I of England and son of the unfortunate Frederick V and Elizabeth Stuart, Winter King and Queen of Bohemia (page 762).

Rupert's family were driven from their throne by Leopold Wilhelm's father, Ferdinand II; yet the two young men had a bond deeper than dynastic enmities—they both loved art.

Tusks of Extinct Tiger Boar Crown This Rhinoceros-horn Goblet

[illegible] diamonds reflect a [illegible] and the [illegible] Left, a [illegible] form once thought a [illegible] against poison. Right, a [illegible] found in the stomachs of certain [illegible] chewing animals. Amulets [illegible] (page 770).

Rupert was the more precise. He was credited with the invention of the art of mezzotint. Scholars now give priority to Ludwig von Siegen, but in any case they count Rupert to have been the better artist.

In the 17th century [illegible] international passport value in any country. The representative figure of this esthetic inter- [illegible] artist, Peter Paul Rubens.

Rubens Foreshadowed United Nations

Of Flemish origin, Rubens painted for the Spanish and Austrian Hapsburgs, the French Bourbons, and the English Stuarts. He advised them in matters of art and of diplomacy, and for his activities was knighted by Charles I of England. He was a citizen of the world.

[illegible] his self-portrait [illegible], he appraised this world shrewdly (page 763).

In view of the cosmopolitanism of Rubens, it is fitting that one of his early masterpieces should be an allegorical representation of the four Continents in happy coalition (page 745).

Here is a painting which should hang in the Assembly of the United Nations [illegible] among the peoples of the world which alone can prevent the outbreak of war, or, in terms of Rubens's allegory, keep the crocodile from attacking the tigress.

Yet, even in the 17th century, ideological conflicts had already begun to divide the unity Rubens typified. It is significant that Leopold Wilhelm apparently did not own a single painting by a great Dutch artist, though his governorship of the Spanish Netherlands corresponds with the period of Holland's highest achievements.

Could it be that the archduke, influenced by the counsels of the Counter Reformation, looked with distaste on the Dutch Protestants and the artists who painted for them?

Later Hapsburg connoisseurs were voracious collectors of Dutch painting. Maria Theresa, for example, acquired a canvas by Jan Steen, entitled "The World Upside Down" (page [illegible]) [illegible] "Feast of the Bean" and Leopold I, Joseph I, and Charles VI all enriched the royal collections with many masterpieces from Holland. [illegible] not that Leopold Wilhelm disliked [illegible] characteristic of Dutch artists. He acquired a fine canvas by the Spaniard Jusepe de Ribera as realistic as anything painted in Holland, though painted with a dramatic emphasis that is typically Spanish.

In the painting of Christ Among the Doctors" (page [illegible]) Ribera [illegible] a remarkable effect by contrasting the pale [illegible] features of the young Christ with the weatherbeaten, browned and wrinkled faces of the old [illegible].

Effects of chiaroscuro, so popular among the Dutch, the archduke could also value for [illegible] of contrasted light and shade as "Al[illegible] and the Burning [illegible]" by Dumesnil [illegible] (page [illegible]). But the greatest artist of his generation, the supreme master of realism and chiaroscuro, Rembrandt van Rijn, he seems to have been incapable of appreciation.

Nor did the archduke lay for his collection the works of another genius of his time, Velázquez. In this case, however, portraits flowed to the court of Austria from the court of Spain, for [illegible] of both parents of Margarita to Velázquez [illegible] year [illegible] of the children of Philip IV have been sent from Vienna for the exhibition.

Margarita Teresa, who at two of the portraits show at the ages of three and five, was married at 15 to the Emperor of Austria, Leopold I, who was the nephew of Leopold Wilhelm and for a time his ward. Velázquez also portrayed her elder sister Maria Theresa (page 745), who married Louis XIV.

All but one of the sons of Philip IV died young. Two of these baby-princes, Balthasar Carlos and Philip Prosper, [illegible] to Velázquez [illegible] magnificent portraits which can be seen in the exhibition (page 755); but the [illegible] destined to reach the throne, Charles II, [illegible] to be satisfied to pose for Juan Carreño de Miranda, Velázquez having died before his birth.

Salomon Gallery

Artist's Error Gives the Clumsy Dodo Two Right Legs

Roelandt Savery [illegible] painted this detail in "A Landscape with Birds," painted in [illegible] for Emperor Rudolph II [illegible] believed to have [illegible] 740). Later [illegible] The flightless, [illegible] extinct since 1681.

In the full-length portrait of Charles II, which has been lent by Countess von Harrach, his [illegible] like his role in history, seem too big for him.

Vermeer's "Artist" Most Valuable

Though [illegible] left the Vienna [illegible] the most valuable picture in the exhibition, "The Artist in His Studio," by Jan Vermeer, belonged to the Czernins, a distinguished Bohemian family whose taste was formed at the Hapsburg court (page 741).

This canvas, which was bought a century and a half ago for the equivalent of [illegible], Adolf Hitler is reported acquired for 2,000,000 reichsmarks, or approximately [illegible] at the official exchange.

Lifelike as a Photograph Seems Teniers's "Archduke Leopold William Inspects Pictures in His Gallery in Brussels"

[illegible]

A 400-year-old Tapestry Depicts Fame's Triumph over Death

[illegible]

[illegible]

When Royal Guests Said, "Please Pass the Salt," Even Strong Men Flinched

Benvenuto Cellini's [illegible] salt cellar [illegible] Francis I of France [illegible] Earth and Neptune [illegible] salt and pepper [illegible]

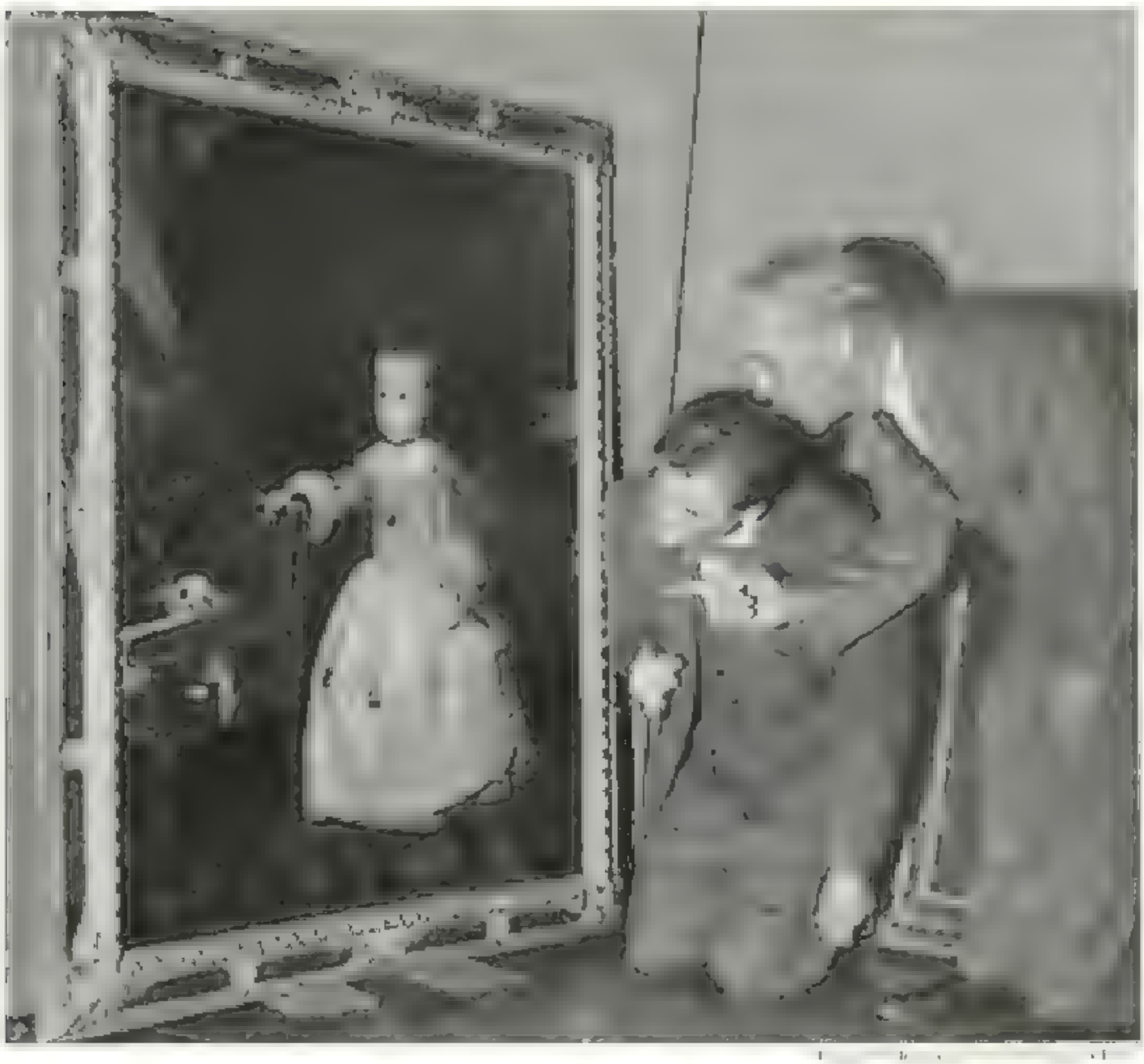
The German Fuehrer intended the "Artist in His Studio" to be the chief glory of the museum he was building in Linz in honor of his mother. A handbook of the projected gallery was illustrated in German type with Vermeer's painting on the cover.

The foreword to this remarkable document has a certain charm. Even to the extent it would seem presumptuous to think of constructing a new gallery at a time when almost all [illegible] of art [illegible] But Hitler's [illegible] the author states without a trace of humor.

The "[illegible]" [illegible] continues, "saved for Germany 'The Artist in His Studio,' a painting Mr. Mellon had offered to buy for $6,000,000."

Like most Nazi statements, the amount of the reported offer by Mr. Mellon contains an element of exaggeration, but [illegible] the price paid for "The Artist in His Studio" through more than 10,000 [illegible] the [illegible] cost was a [illegible].

Subsequently, the picture was found by United States troops in a salt mine at Alt Aussee, Austria, the vast depository of looted art which Hitler intended for his museum at Linz. It was returned to Vienna by the Army as part of our restitution program. The Austrian government immediately nationalized it and presented it to the Kunsthistorisches Museum in Vienna.



Work Regal Poise, Spanish Princeline and Dog Gaze from a Velazquez Canvas

Dr. Ernst H. [illegible] Vienna curator (right) explains the Infante Philip Prosper's pitch attitude to Mary Lorne [illegible] assistant director of the [illegible] of Art. King Philip IV of Spain presented the portrait of his son to Emperor Leopold I of Austria [illegible]

The [illegible] of Vermeer's masterwork is breath taking. Its magical rendition of light, its subtle harmonies of warm and cool tones, its complex organization of color and detail, its unsurpassed expression of visual actuality in terms of paint—all these qualities are self-evident and need no comment.

Collection Grew Even in 20th Century

During the 18th century the great collections of the Hapsburgs were brought together to form something resembling a modern museum. At the beginning of the century they were concentrated in one wing of the Imperial Palace, but later they were transferred to a separate palace known as the [illegible]

The [illegible] of paintings continued to [illegible] and [illegible] were filled by such great [illegible] "Madonna of the Rosary" by [illegible] masterpiece once presented to the [illegible] church in Antwerp by a group of artists headed by Rubens [illegible] own painting [illegible]

[illegible] in the 20th century [illegible] World War I [illegible] Austria [illegible] Museum [illegible] A [illegible] Hapsburgs have not fundamentally changed the [illegible]

In 1783, under the influence of the ideas that led to the French Revolution, the Belvedere Gallery was thrown open to the public. The art historian, Christian von Mechel of Basel, wrote in the introduction to his catalogue of the museum:

"The aim of all these endeavors has been to arrange a gallery that . . . should be, as much as possible, a source of instruction and a visual history of art. A great public collection of this kind, aiming at educational purposes rather than at passing pleasure, can be likened to a rich library, where he who is thirsting for knowledge will be happy to find works of every kind and of all periods."

The emphasis on education as the justification for a museum gives Christian von Mechel's introduction a modern tone. It is important, however, to remember that the collection he was presenting to the public had not been gathered by the Hapsburgs for "educational purposes." Instead, nearly every object in it had been acquired for a "passing pleasure."

An Artist Fights Off Four Robbers

The great saltcellar of hammered and cast gold which was made by Benvenuto Cellini for Francis I of France was certainly not commissioned for educational purposes (page 754).

Cellini describes in his autobiography how the king said to him "with a pleasant cheer, that having now so fine a basin and jug of my workmanship, he wanted an equally handsome saltcellar to match them." Francis arranged for Cellini to be given a "thousand crowns of good weight and old gold."

Then follows the famous description of Cellini's fight with robbers, as he carried the gold in a basket on one arm and drove off his assailants with the other.

Arrived at his lodgings, Cellini called to his apprentices, vaunting: "Those cowards yonder, four against one man alone, had not pluck enough to capture a thousand golden crowns in metal, which have almost broken this arm of mine. Let us haste inside and put the money away; then I will take my big two-handed sword and go with you wherever you like."

Finally the saltcellar was finished, and Cellini presented it to His Majesty, who "uttered a loud cry of astonishment, and could not satiate his eyes with gazing at it."

Fortunately for us, this saltcellar was later presented by Charles IX of France, grandson of Francis I, to Archduke Ferdinand of the Tyrol, whose niece he married and who acted as proxy at the wedding. Had it remained in France, it would undoubtedly have been melted down to help finance the Revolution.

The Hapsburg treasure has survived in its entirety largely because Austria has so far escaped a really violent and prolonged proletarian uprising and has resisted, with wisdom and fortitude, the wave of Communism which has engulfed the rest of Central Europe.

The Roman Catholic Church, though reduced to an implacable guerrilla warfare with Moscow, has always, even in the dark days of Moslem expansion, held the fortress of Austria against the forces of the East. The religious objects sent from Vienna deserve, therefore, a special reverence as symbols of this age-long resistance.

Among these works of Christian art, one of the most venerable is the service for the Mass given by Count Berthold of Andechs to the Abbot Heinrich von Wilten in connection with the founding of the city of Innsbruck about the year 1150. It consists of a chalice for the sacramental wine, a paten for the sacramental wafer, and two tubes for drinking the wine. The set is made of silver gilt with niello inlays of Old and New Testament scenes (page 775).

Many of the secular objects in the exhibition also recall the role in European history of the Hapsburgs and their ancestors. An example is the oriental ivory hunting horn supposed to have belonged to Albert the Rich, who died in 1199 and was the grandfather of Rudolph I, founder of the Hapsburg dynasty.

There is the armor worn in the field by Maximilian I, Holy Roman Emperor, and the horse armor which he inherited from his father, Frederick III (page 758). So caparisoned, he fought with the League of Cambrai. There is the tonlet armor, so called from its broad skirt, or *tonnelet*, of his descendants Ferdinand I and Maximilian II, designed for foot combat in the lists.

Among these Austrian treasures, too, are the helmet, shield, and pistols of the greatest collector of armor who ever lived, Archduke Ferdinand of Tyrol, who assembled at his castle of Ambras the weapons of his ancestors and "of the great warriors and heroes of our days and of the past," as he himself put it.

Poison-proof Goblet Poisons Princess

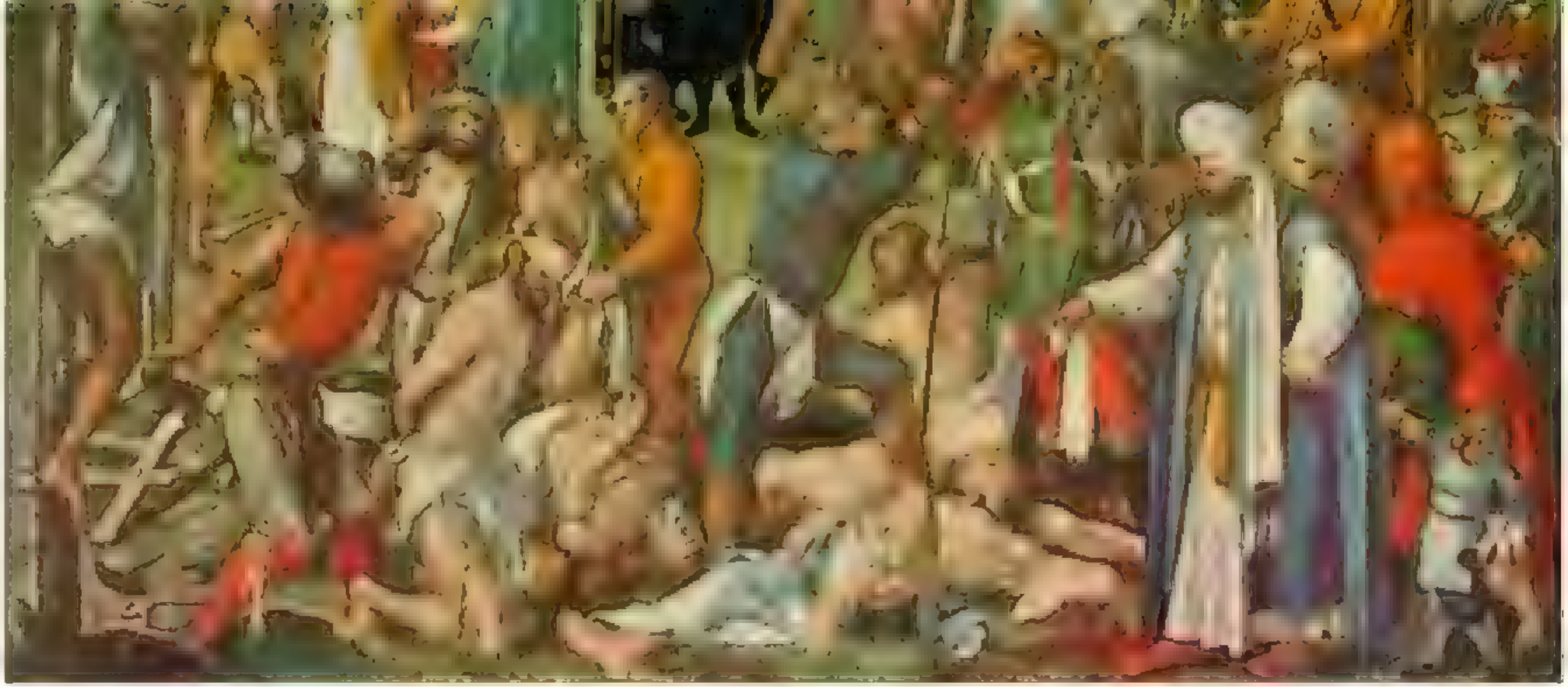
Through the wife of Maximilian I, Mary of Burgundy, the Hapsburgs also inherited the Burgundian Treasure. The unicorn sword shown in the exhibition belonged to Mary of Burgundy's father, Charles the Bold. The grip and scabbard are made from the horn of a narwhal, an arctic cetacean somewhat like a whale (page 750). Its long horn was often

[illegible] • Portrait de Sixte de Venise

[illegible]

[illegible] Dance

[illegible]



[illegible]

[illegible] The Martyrdom of the Two Thousand Christians Under Julian Sapor at Persia

[illegible]

[illegible] Prince Regent of Portugal

[illegible] Portrait of Mr. [illegible]

[illegible]

[illegible] • Portrait of a Old Man and a Boy

[illegible]

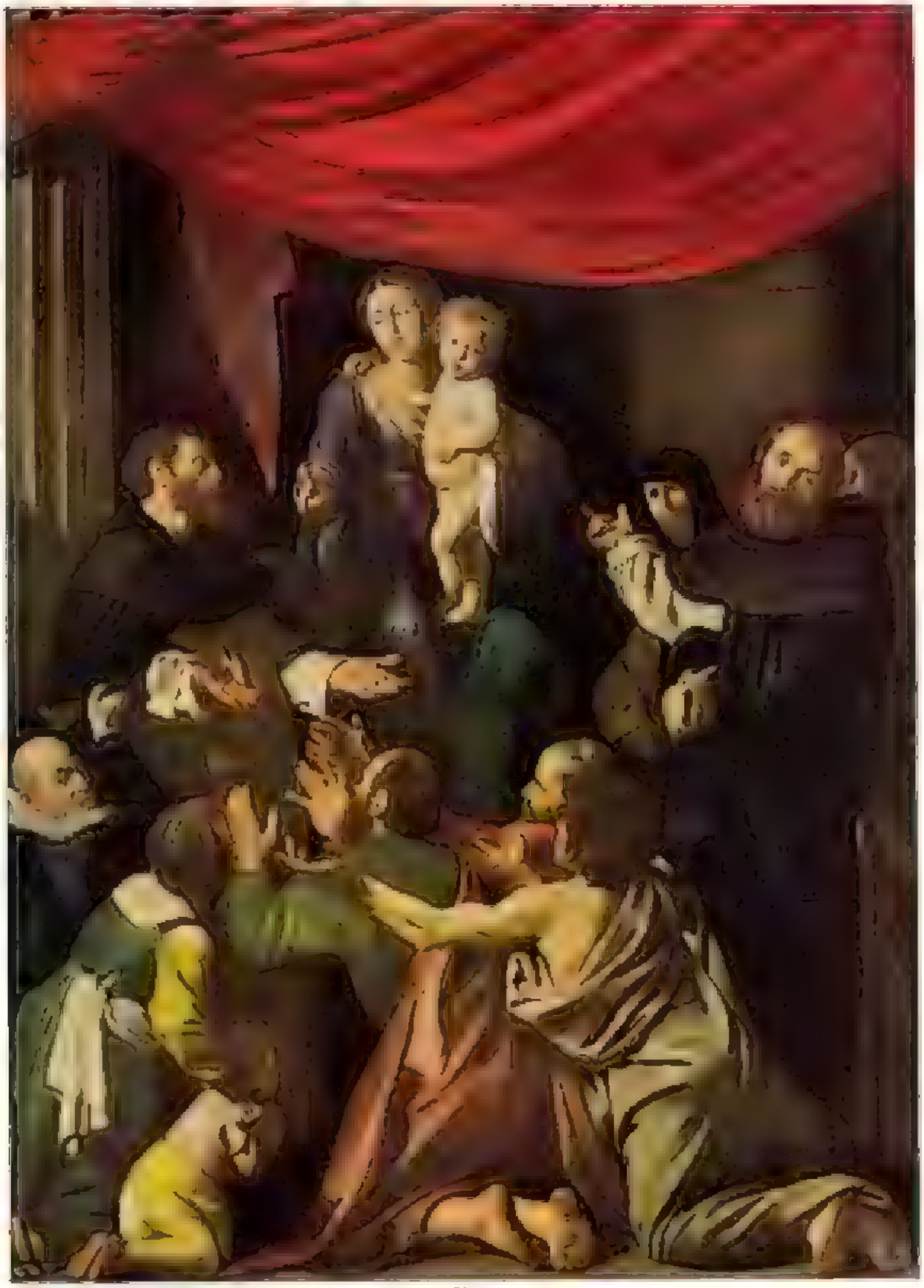
[illegible] - *The Odyssey [illegible] Following the Voyage*

[illegible]

[illegible] A Dakotan Scout Rescuing [illegible] Bridge

VERONESE — Christ Healing the Woman with an Issue of Blood (National Gallery)

[illegible] — The Virgin and Child with the Saints Catherine and James the Greater



MICHELANGELO BUONARROTI (1475–1564) • The Madonna of the Doorway

passed off as that of a unicorn and, as such, considered a talisman.

There is also the court goblet of Charles the Bold's father, Philip the Good of Burgundy, who established the Order of the Golden Fleece. Perhaps from this beaker he may have toasted Joan of Arc, with whom he formed a temporary alliance for the destruction of the English, a betrayal which Shakespeare so bitterly commemorates in the lines in *Henry VI*: "Done like a Frenchman: turn and turn again."

The goblet is cut out of rock crystal, a transparent quartz, once considered ice from the highest mountains, frozen so hard that it would never melt. It was supposed that poison poured into rock crystal would turn milky white, thus safeguarding against treachery.

Ironically, it was rock crystal itself, however, which poisoned the great-granddaughter of Philip the Good, Margaret of Austria. She was the aunt of Charles V and for 23 years acted for him as the shrewd and able ruler of the Netherlands.

One night when Margaret's maid in waiting was bringing her a drink, the crystal jug fell to the floor and broke. The pieces were picked up, all but one tiny sliver which was overlooked in Margaret's slipper.

When the princess put on the slipper, she cut her bare foot. Gangrene set in, and Margaret died of an overdose of opium given her by her physician before amputating her leg.

In the exhibition there are several 15th-century Burgundian crystals which doubtless belonged to the unfortunate Margaret. Especially fascinating is a jug which has a handle seemingly reworked or repaired at some time in the remote past. Could this perhaps be the fatal piece that fell and brought about the death of this great Hapsburg collector?

The Hapsburgs feared poison. As a safeguard, Rudolph II, the great-great-nephew of Margaret of Austria, had a number of beakers and goblets made of the most bizarre materials. One is fashioned from narwhal horn, that rare substance already mentioned (page 750). The ivory tusk of this sea mammal was popular because it was thought an excellent antidote for poisonous drinks.

Another goblet in the exhibition is composed of an even more curious material, known as bezoar, a concretion found in the alimentary organs of certain ruminants. The word itself in archaic French means "protection from poison." Bezoar was also considered a remedy against infectious diseases, the penicillin of its time!

Though our medicines have certainly improved, their containers have become less precious. The most costly box for ointment ever made is still an unguent jar cut in the 17th century by a family of jewelers known as the Miseroni, from the largest emerald in the world.

This box, however, like the best pharmaceutical containers today, is really American, [illegible] back to Europe after the conquest of the New World. So this is its second transatlantic crossing.

When the courtaid jar is returned to Vienna this time, it will be to the Austrian Republic and not to the descendants of the Hapsburgs as original owners; for the Hapsburg throne is now merely a museum exhibit. Its woven hangings are part of the vast stock of tapestries, some 900 in number, kept in a depository in Vienna, whence a few have been sent for the passing adornment of the walls of American museums (page 753).

Treasures Buried in Mountain

All these treasures of the Hapsburgs, "fairer to see than marvels," were for a time transferred to the inappropriate custodianship of the former Austrian paper hanger who led the Nazi career of crime. The holocaust he precipitated caused them to be buried deep in a mountain.

When retribution was close behind them, Hitler and his gauleiters tried to destroy a large part of the artistic heritage of the world—all that has come to America in this exhibition and infinitely more. Fortunately their plans failed but the escape of this treasure was a dramatic event of the war.

I have told part of this story in an earlier number of the NATIONAL GEOGRAPHIC MAGAZINE, but at that time I mentioned only the loot taken from France, Belgium, the Netherlands, and Italy. However, the fate of this booty and the fate of the Austrian treasures were really interlocked, for all were stored in the same Austrian mountain, which is honeycombed with salt mines.*

On the eastern side of this mountain, at Alt Aussee, the Germans had buried thousands of paintings, masses of sculpture, arms, armor, furniture, tapestries—every form of art, almost all of it stolen.

"The Artist in His Studio," by Vermeer, was hidden there side by side with the greatest of all Flemish paintings, the Ghent altarpiece by Hubert and Jan van Eyck, such masterpieces of sculpture as the Bruges "Madonna and Child" by Michelangelo, and some of the great paintings from Italian museums.

* See "Europe's Looted Art," by John Walker, NATIONAL GEOGRAPHIC MAGAZINE, January, 1946.

A Blind Art Lover "Reads" the Face That Inspired the Spanish Armada Against England

[illegible]

Their Problem, Unloading 50 Tons of Europe's Most Precious Art Works

[illegible]

Through Silver Straws Worshipers Sipped Communion Wine from the Wissen Chalice

German artisans fashioned this silver-gilt eucharistic service about 1160. Count Berthold IV of Andechs when he acquired monastery lands to found Innsbruck, presented the set to Abbot Heinrich von Wolfen. Decorations in niello, or inlay, on the chalice show Old and New Testament scenes, the four rivers of Paradise, and the four cardinal virtues. The paten, or plate, used for bread, also bears a [illegible]

The provincial gauleiter, on orders probably from Hitler himself, prepared to blow up the whole mine. Bombs were actually placed in the chambers, ready to be set off. These, however, were surreptitiously removed by the Austrian salt miners; and, to make it impossible for the SS troops to re-enter, several were exploded at the entrance, thus sealing up the mine and saving its contents.

For the past four years, under the direction of our Military Government, these treasures have been steadily flowing back to the countries whence they were taken, until now nearly everything of importance has been returned.

In July, 1945, I visited Alt Aussee to report to the State Department on measures for the return of this vast reservoir of loot. From Alt Aussee one of the Monuments, Fine Arts and Archives officers of the United States Army motored me to the opposite side of the mountain, to Laufen, near Bad Ischl, where the Viennese treasures were buried.

An Austrian curator took us into the bowels of the mountain, then into a rickety elevator. In the darkness we ascended a shaft the equivalent of six stories and entered a vast vault. From here we could dimly discern long corridors lined with unboxed pictures or piled with packing cases.

These were the Vienna collections. We missed, however, the great Breughels, Velázquezes, Rembrandts, Titians, and Dürers which had been sent to the mine from the Kunsthistorisches Museum.

Masterpieces Captured by Americans

On inquiring, we were told that storm troopers had arrived, shortly before the collapse of the German armies, and in the middle of the night had held up the curator with tommy guns and forced him and his assistants to load trucks with the cream of the collection of paintings. They had driven off, saying that they were going to put the pictures in tanks and fight with them to the end. After that the curator had no idea what had happened.

Actually, the storm troopers headed for Switzerland with their swag, but fortunately they ran head on into the American Army. Our soldiers captured the pictures which were sent into Salzburg. All this we learned later.

The next day we arrived in Salzburg, where we asked the property control officer, a most efficient and able executive, whether our Army

An Expert Appraises the Michael Goblet, a King's Gift to an Archduke

[illegible] V. Strohmer, Vienna [illegible] curator of [illegible] examined the Austrian art works to have [illegible] masterpiece [illegible] and enamel. With Dr. Strohmer [illegible] Museum [illegible] the Austrian collection [illegible] story of the Austrian [illegible] IX [illegible] presented to [illegible] Prince of the Tyrol in [illegible]

had picked up any works of art. He said he had a lot of paintings in an old warehouse which he was [illegible] carefully. He would [illegible] when he [illegible]

We [illegible] the warehouse, which was [illegible] showed us with [illegible] which the Army [illegible] also captured, and afterwards took us to see the paintings.

There they were—the greatest of the Austrian pictures, some of the finest paintings [illegible] in open trucks, through the retreating Nazi armies and abandoned at St. Johann in the Tyrol, a few minutes before the arrival of the [illegible] yet they had not [illegible]

I [illegible] panel with [illegible] and [illegible] them all. [illegible] property [illegible] These must be imported.

I replied that he was worried about $5,000,000 [illegible] gold, but his real responsibility was more than $[illegible] worth of paintings.

When he came to see these works of art at the National Gallery in Washington a few months ago he told me I had given him a bad case of shock complicated by insomnia.

From the warehouse and the salt mine on a wintry day just before Christmas, 1945, these treasures were loaded on a train and sent to Vienna. Subsequently a part of the collection was shown in the Hofburg, and a Viennese newspaper of December 20, 1945, wrote of "General Clark's wish to give Vienna and Austria [illegible] at this particular [illegible] special Christmas [illegible]

The return of these [illegible] to the Austrian people was more than a Christmas surprise. It was a symbol of the rebirth of art [illegible] of war. Once more [illegible] in honor of the re[illegible] National Gallery in London:

> [illegible] kept in the caves are awake [illegible]
>
> [illegible]
>
> [illegible]

Roaming Korea South of the Iron Curtain

By Enzo de Chierchat

IMAGINE the United States divided into North and South by a border from east to west at about the latitude of San Francisco, with a Communist curtain over the North and guerrillas raiding the South. Then you will have some idea of the difficulties faced by Korea.

The arbitrary division into Northern and southern Zones, which began as a military expedient for disarming of Japanese troops by American and Russian forces, became Korea's real tragedy.

Now turned into a rigid political barrier between Communist-dominated northern and democratic southern Korea, the 38th parallel cuts across villages, mountains, streams, roads, [illegible] (page 77[illegible])

North Korea is rich in minerals, timber, [illegible] and concentrated heavy industry. South Korea is the food-producing half, though it also has some industry and mineral resources. It is primarily agricultural, has well-developed fisheries, and contains the capital city, Seoul.

Trains, Mines, Industries Going Again

As I viewed the problem at close range, the difficulties in the way of the new free government at Seoul seemed almost insuperable. But, comparing Korea's present condition with the complete disruption which it faced at first, one sees striking progress.

Assisted first by American Military Government and later by the Economic Cooperation Administration, South Korea today is getting its railways repaired, and its trains running on schedule.*

Short extension lines are being built in the south to tap the tungsten, coal, and other minerals of the east coast district which formerly fed Japan's war industries (page 790). Mine operations are being extended and new mineral deposits opened.

There is still a shortage of electric power, but steam facilities are being expanded and new hydroelectric projects are under way. Industries that were completely halted when Russia turned off the power from the north (page 795) have again started to run; so there are more cotton cloth, paper, bicycles, and other products to supply local needs.

Thanks to imported fertilizers, the heavy importations of grain have declined. The Seoul Government and ECA estimate that, barring unforeseen disasters, the 1950 rice crop will supply South Korea's own needs and also should yield a surplus.

When, in January, 1948, I was asked to go to South Korea as adviser to the chief of the Geological Survey of Korea, my feelings were mixed. I had heard that the country afforded difficult living conditions for Americans. Friends and family advised me not to go there because of the proximity of the "Iron Curtain." But my curiosity and eagerness for travel soon overrode my hesitation.

Seoul a Crowded Capital

Two months later I stepped ashore at Inchon, busy port about 20 miles east of Seoul (page 794).

The Korean capital was crowded. The population [illegible] years. Since the war there had been a heavy influx of refugees from the Russian Zone and Korean repatriates from Japan, China, and islands of the Pacific. Materials were short during war years and since; every house and building needed repair and a good coat of paint.

Seoul is beautifully located in the midst of steep granite hills. Wide avenues give it a Western atmosphere, as do the many new modern buildings built when Korea was part of the Japanese Empire (pages 778, 782, 783). But many of its streets are unpaved and bordered by humble shops.

Oddly assorted vehicles clogged avenues and narrow streets—oxcarts; dilapidated Japanese three-wheeled cars and motorcycles, gaily painted buses drawn by gaunt horses; rickshaws; [illegible] Korean officials; U. S. Army staff cars, jeeps, and trucks; [illegible] with passengers hanging from the steps.

Traffic policemen, like those of Japanese cities, were as busy as ballet dancers. Their dramatic gesticulations looked like a ballet version of an American policeman directing traffic.

Seoul's male population wears mixed garb, part Western and part Oriental. In contrast are the women's dresses, their style unchanged for centuries. Those of older women are white with embroidered velvet bonnets; younger women and girls have long high-waisted skirts and short bodices in pastel colors—pink, robin's-egg blue, and aquamarine. Many mothers carry babies slung on their backs in bright red and green quilts.

Here, too, are schoolboys in high-collared jackets and caps, children in bright-yellow

* See "With the U. S. Army in Korea," by Lt. Gen. [illegible] June, 1947.

Korean Armed Forces Parade in Seoul to Celebrate the Republic's First Birthday

and red dresses (page 804), and ragged coolies carrying tremendous loads on wooden racks strapped to their shoulders.

Seoul Bursts into Bloom

During my first few days in Seoul the weather was still cold and the trees barren. A week later, as if by a sudden explosion, everything burst into bloom. Masses of yellow forsythia were succeeded by snow white cherry blossoms.

The city has several fine parks, such as the Royal Botanical Gardens, Pagoda Park, and the capitol grounds, landscaped with ponds, pavilions, and centuries-old monuments. The temples show how Korean architecture has been influenced by the Chinese for more than a thousand years.

Fifty yards from my Quonset hut in a park was a sleepy pond where stood the ruins of an elegant octagonal-shaped pavilion in Korean-Chinese style.

A Nation-splitting Boundary Is Modern Korea's Tragedy

Potsdam Conference, in July, 1945, established the 38th parallel as the Korean boundary between U. S. and Russian forces. This political frontier cuts across villages, streams, and roads. Heavy industry is concentrated in North Korea, rich in minerals, timber, and hydroelectric power. The south, chiefly devoted to farming and fishing, is the Japan-made belt.

Once settled, I reported for duty as adviser to the Geological Survey. I was well received by the director, Dr. Park Dong Ki, a learned quiet gentleman who did his best with the little means at his disposal to facilitate work in Korea. The Geological Survey had a personnel of about 50.

After the Japanese occupation at the beginning of the century, Japan realized that Korea could be an important source of materials in her plans for dominating the Far East.* In 1919 the Geological Survey of Chosen (Korea) was organized. Laboratories and libraries were set up in a group of modern buildings overlooking the Han River five miles west of downtown Seoul.

Japanese geologists and engineers explored all Korea to locate and develop mineral deposits. Coal, copper, zinc, lead, graphite, and tungsten deposits were developed. The gold industry was heavily subsidized, and all Korea produced more than 27 metric tons of lode and placer gold a year in the period preceding World War II.

Koreans Trained to Replace Japanese

To save foreign exchange, the Japanese worked the mines under the autocratic [illegible] used in other totalitarian countries, and pro-

* See "Jap Rule in the Hermit Kingdom," by Willard Price, NATIONAL GEOGRAPHIC MAGAZINE, October, 1944.

duction costs were not taken into account. Many of these mines opened by the Japanese cannot operate profitably in a competitive world market.

During her 40-year occupation, Japan allowed few Koreans to hold important jobs. After the defeat of Japan in 1945, all Japanese in South Korea were sent back home. There was a shortage of trained technicians, foremen, and administrators to run the country. Whole corps have had to be trained.

Koreans are extremely intelligent and charming, but highly individualistic. I found them cooperative and efficient if allowances were made for the etiquette and procedure of the Far East. They are always afraid of losing face.

The worst mistake an American could make in dealing with them would be to criticize them in front of equals or subordinates. A Korean thus offended would never forget the insult.

3,000,000 More Mouths to Feed

One of the country's biggest problems is overpopulation, without enough tillable land available for more crops. Before the war, Korea south of the 38th parallel had about 15,000,000 people—in an area roughly the size of Maine. There are more than 20,000,000 now. The big increase in less than ten years is due to the high birth rate and the influx of refugees and repatriates.

The American occupation forces did an excellent job in taking care of the refugees by checking and improving sanitation, by vaccination, controlling the drinking water, and conducting delousing campaigns. During my stay I heard of no serious epidemic of cholera, typhus, or other infectious disease. Ironically, however, these measures aggravated the problem of overpopulation!

Geographically, this peninsula country presents two contrasting faces.

The west coast has a partly submerged shore line with almost fjordlike bays and many islands. The waters of the Pacific Ocean rush into the Yellow Sea, causing high tides which fluctuate up to 25 feet and more, and have created broad tidal mud flats.

The east coast has a straight, steep shore line. Mountain slopes plunge precipitously to the sea or form narrow beaches. Here the water, instead of being muddy as on the west coast, is clear and ideal for swimming.

The contrasting east and west coast features indicate that Korea has been tilted down on the west and up on the east. As a result of this tilt, the principal drainage divide is parallel to the east shore and only about 15 miles inland.

Small, short streams descend abruptly to the Sea of Japan. Rivers reaching the Yellow Sea, however, meander tortuously through several chains of mountains.

Peering Past the Iron Curtain

I arrived in Korea two months before election of the new free government took place on May 10, 1948, under United Nations supervision. Much to my satisfaction, I was made a civilian observer.

A temporary United Nations Mission for Korea, sent out in January that year, was refused permission by the Russians to investigate North Korea.

In the Southern Zone, the American Military Government gave all facilities to permit the Korean people to have a really free election. Two American civilian observers were sent to each gun, which corresponds to a county in the United States.

Before leaving Seoul, we had been given orders to refrain from interference in these elections in any way whatsoever. We were merely to observe and report any irregularities.

I was lucky in being assigned to one of the most scenic sections of Korea, the Kangwon Do. This *do*, or province, cut almost in half by the 38th parallel, is very mountainous and one of the few regions in South Korea which still have tracts of virgin forest.

We left Seoul in a convoy of jeeps and trucks and arrived the same evening in Chunchon, capital of the province, only eight miles from the Russian line. I had opportunity in the course of my stay to go to the 38th parallel, but I saw no Russians. The men I saw in the distance were probably Russian-trained North Korea soldiers.

Election Postponed Because of Eclipse

On May 7 I left Chunchon by jeep with a young GI driver from Alabama, a Korean interpreter, and two cases of Army C rations. We arrived late that evening at Pyongchang, a typical small Korean town, seat of the Pyongchang gun, where I joined another American civilian.

We slept in Korean fashion on the floor in the house of the district governor. Not being accustomed to sleeping with only a quilt over a straw mat, I found the first night rather hard on my bones.

The following morning I started early and inspected all the voting polls in the northern part of the gun. Every man was busy that day, helping set up voting places. For the first time in Korean history a free election was to take place, and everybody recognized the importance of the event.

Feather Dancers on Sword Pattern Gymnast Madly Waves a Korean Dancer

[illegible]

Stars and Stripes and Hammer and Sickle Flank the Korean Pavilion at Duk Soo Palace, Seoul

Bath for Japanese Seoul City Hall Now Serves Koreans

Husband Wears Western Ensemble; Wife Comes in Antique Dress

[illegible]

Youngsters Bloom in Bright Silks for a New Year's Festival

[illegible]

Charming Priest and Prostrate Women Worship at White Buddha Shrine near Seoul

Thatched Farm Houses and Green Rice Terraces Snuggle in Narrow Valleys Between Folded Hills

Headbands, Flowered Hats and Bright Sashes Transform Farmers' Everyday Dress into Dance Costumes

[illegible]

[illegible]

Strange to Western Eyes and Taste Are the Dishes Prepared by Korean Housewives

On the morning of May 9, we were treated to an eclipse of the sun. In fact, the elections had been postponed one day because of that event.

Earlier I had visited the site near Chonan where an expedition, sponsored by the National Geographic Society, had been set up to observe the eclipse.*

As we passed through a village, people were looking at the eclipse by watching the reflection in streams or pools. When I suggested that it would be much better to use smoked glass, the whole village went hunting for brown glass.

That day I visited a school and talked with the electoral committee about setting up the polls. When I came out, the American driver had disappeared with the jeep.

For a few minutes I was worried, but at length saw the jeep kicking up a swirling cloud of dust. The driver had been unable to resist the pleas of the village children to give them a ride. It was against Army rules to seat more than four people in a jeep, but in this I counted 17 youngsters, all having a marvelous time (page 792).

Communist Raider Killed at Polls

At 8 o'clock the following morning, May 10, the polls opened. I had to inspect about 25 voting places. Each was decorated with gay banners and Korean flags (page 783), and everybody, even the sick and the aged, turned out.

In front of each booth were photographs of the four candidates of the district with the corresponding symbols, I, II, III, IIII, like bars, placed above them. The ballots had four columns each headed by a bar symbol, and the voter had only to mark a cross in the column that corresponded to his candidate (page 784).

Women not only were free to vote, but were encouraged to do so. However, there was a typical example of Korean compromise. Most polling places had special lines for women, and they were the first to vote. By 9 o'clock most of them had already gone back home to attend to domestic duties. The men voted at leisure until 5 p. m., when the polls closed.

We had been instructed to make sure that a secret voting space was provided, to see that the voting boxes were sealed, and also to report any fraudulent actions or disturbances at the polls.

The only serious incident in my area that day was the reported shooting of a [illegible] by Korean police at Poll No. 42.

When I reached the spot, in a thick forest, several Korean policemen told me that the Communist had just been buried. During the previous night a band of roving troublemakers had come south from the Russian Zone and clashed with a Korean patrol.

Whole Convent Turns Out to Vote

Returning from Poll No. 42, I saw a line of a dozen persons wearing white or gray robes walking the mountain road with their hands clasped as if in prayer. Because of their shaven heads, I first took them for men, but the interpreter informed me that they were Buddhist nuns. The Mother Superior was leading the whole convent to the polls!

Through my interpreter she asked if I would visit the nunnery near by and the Buddhist pagoda of Onuka San.

This temple was a jewel of early Korean architecture. The setting was a large tract of forest of huge pines and spruces, large oaks and maples, starting to bud. There was a rushing stream with banks bordered by wild azaleas.

The Mother Superior told me that she wished the United States forces would stay in Korea. She said the beautiful religious properties and monasteries in the Russian Zone had been confiscated and the timber surrounding every Buddhist temple felled.

The Korean people on the whole are not highly religious. Buddhism, powerful up to the late 14th century, has lost much of its influence. Many of the better-class Koreans try to follow the rules set down by Confucius. Buddhism appeals more strongly to the female population, but is distorted by many superstitions (page 785).

The average Korean, excluding the Christians, believes in a mixture of spirit worship or animism, Buddhism, and Confucianism. Spirits dwell in everything. One of the most important groups inhabits the mountains.

Sake Flows Freely at Korean Banquet

Much of our time was devoted to supervising the balloting at the county seat of Pyongchang, where a full 99 percent of the registrants voted.

After the election we were invited by the electoral committee to a Korean banquet. It was my initiation into real Korean hospitality. Some 30 of us sat on the mat-covered floor in a large room with no furniture except for a few low tables about a foot high.

My interpreter explained that in Korea it was impolite to refuse a drink. If anybody in the party offered a guest his cup, the guest had to accept it.

* See "Operation Eclipse," by William A. Nunn, National Geographic Magazine, [illegible] 1954.

Manpower, Yoked to a Rope Sling, Moves Rocks to Build a Mountain Railroad

[illegible]

[illegible] hundred [illegible]

[illegible] a timely tip from [illegible] hacked up under the table. [illegible]

How a Korean Farmer Lives

A few years later I visited the Sangdong [illegible] mine, one of the most important deposits of this material in the world.

When the [illegible] mine will [illegible]

[illegible]

[illegible] area still has [illegible]

[illegible]

Bowed Heads and Deft Fingers Concentrate on 4-H Club Needlework

[illegible] clover-leaf symbol in South Korea in 1948. [illegible]

[illegible] and a variety [illegible] in dry belts.

[illegible] of the population [illegible] farmer is virtually self-sufficient. In contrast to the urban population, he has no worries over food rationing and shortage of power.

The farmer raises his own food, and his womenfolk spin and weave cotton, silk, and hemp. Almost every village has a potter and [illegible] river and a little game [illegible] The farmer [illegible] dried and salted sea foods [illegible]

[illegible] Formerly, much of it was supplied from the North, and the remainder of fertilizers must be imported from [illegible] Fortunately, American aid has eased this critical need, but the Republic is expected [illegible] provide the bulk of its own requirements.

In most homes women and men have separate [illegible] The courtyard of this farm home was filled with tall jars of a wonderful brown luster. These are used especially to store pickled cabbage, a highly seasoned dish called *kimchi* [illegible]

The large [illegible] strong translucent [illegible] glass windows [illegible] Korea. Formerly these [illegible] with springs [illegible] paper. Nowadays [illegible] beautiful old lacquered chests [illegible] and inlaid with [illegible]

GI Joe Takes 17 Korean Youngsters for a Ride—All at Once!

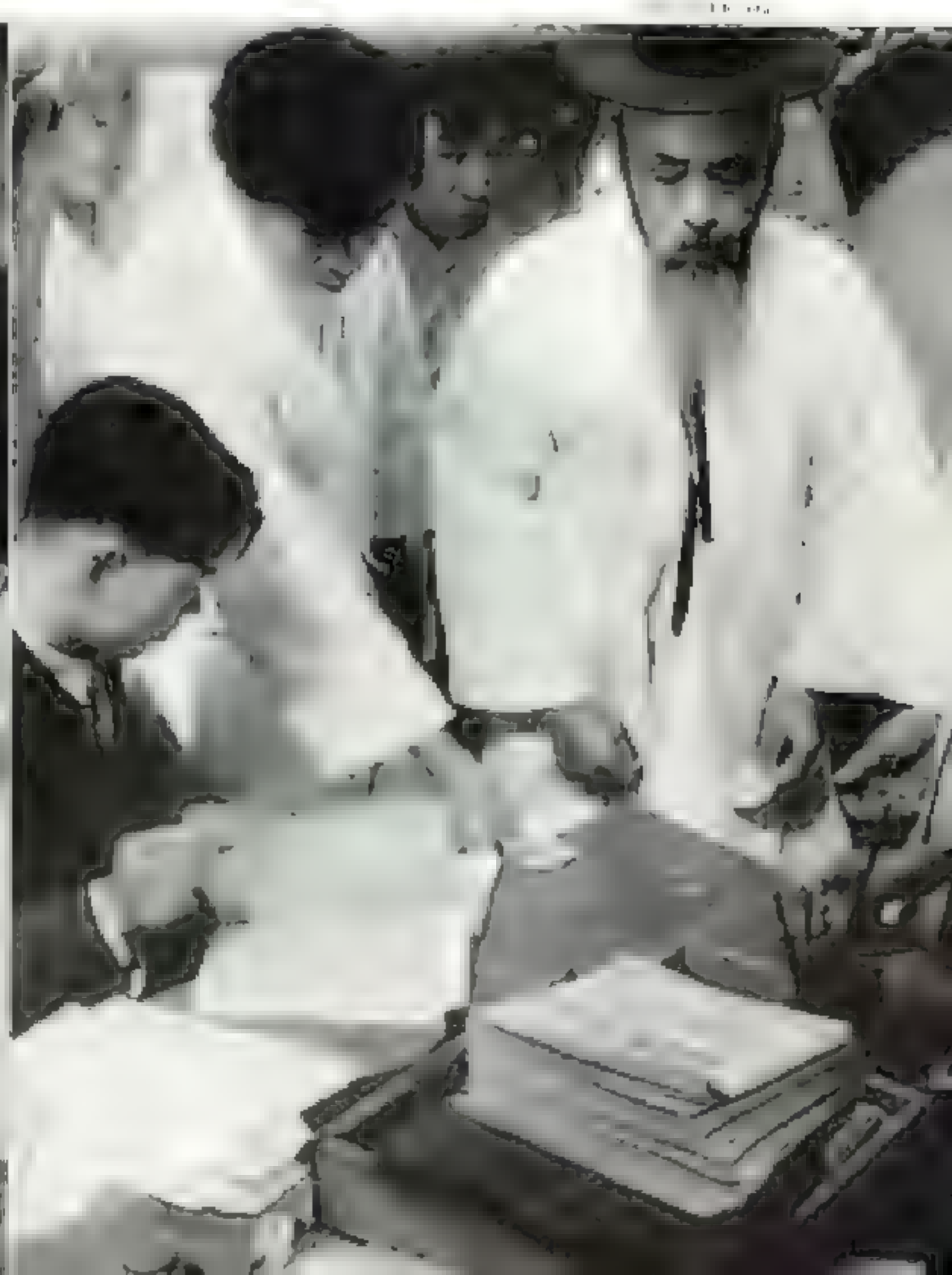
[illegible]

GI's Are Given Nose, not Latitude 38 Still Divides Korea

[illegible]

May 10, 1948: South Koreans Flock to the Polls for the First Free Election in Their Country's History

[illegible]



Lining the Dock at Inchon, Soldier-Husbands Eagerly Await Their "WIFE" from the States

[illegible] U. S. Korean Mission. [illegible]

locks. In them were kept the [illegible] and family heirlooms.

Koreans in Mourning Wear White

We found our genial [illegible] dressed in cotton or stiff hemp [illegible] the traditional color of mourning in Korea. An uncle had died the preceding year [illegible] white I worn for three years [illegible] Korean families are in mourning much of the time.

The aged grandfather of the family was wearing an old-style horsehair hat [illegible] consists of three parts: a [illegible] of horsehair net, worn all the time; a hard horsehair hat, similar to a Welsh woman's [illegible] dress, perched atop the forehead when out of doors; and a conical oiled-paper overcoat for use in wet weather.

The old gentleman was smoking a [illegible] pipe with a tiny brass bowl—just enough for a few puffs. When I gave him a cigarette he tore the paper off and [illegible] in his pipe. The one cigarette made three fillings.

The men I met were dressed in white pantaloons or [illegible] short vest worn over a balloon-sleeved [illegible]. The women wore white [illegible] shirts much shorter than those I had seen in the towns, and small narrow bodices which only partly concealed their breasts. Several youngsters played in the courtyard of [illegible] irrigation ditch near by.

The women brought our warmed rations [illegible] on low tables, bowed deeply and disappeared. Peasant women never associate with men not of their own family.

Into Korea's Coal Country

One of my field trips was to study the geology of the Sanchok anthracite basin near the coast of the Sea of Japan. This basin is the largest producer of coal in South Korea. Much of the fuel is a poor anthracite and not [illegible] to burn unless mixed with bituminous coal, but its use reduces imports of other fuels.

During its peak wartime year under Japanese operation, this mine had an output of [illegible] of all the anthracite and lignite mined in South Korea. In this past year its production has been brought back to one-half of its peak level. With the assistance of our Economic Cooperation Administration, plans are being made for the installation of new crushing and grading equipment to remove waste material here at the source to cut transportation costs.

Coal from here is used to fire the nearby Yongwol power plant, largest single source of electricity in South Korea since the Russians, on May 14, 1948, pulled the switches and shut off two-thirds of the power South Korea normally uses (page 808).

En route to the mine, my Korean driver, unfamiliar with the road, missed a return around a washed-out bridge. Fortunately, by swerving we landed in the end ammunition instead of the river. Although there were a village and several farmhouses near by, no one had bothered to put up a warning sign.

We wasted several hours before a Korean truck pulled us out of the hole. Since we could not reach the mine that evening, we stopped near Chechon at a native inn famous for its hot springs.

I eagerly availed myself of the luxury of a hot bath. Returning to my room along a veranda, I could not help seeing into three rooms where Korean parties were going full blast. They had all varieties of food, American and Korean whisky, beer, and kisaeng girls singing and dancing. I took for granted that the hosts were of some prominence.

To my astonishment, my interpreter told me that the "big men" were Korean truck drivers spending the night on the long haul from Seoul to Pusan. He explained that the truck drivers and big black-market operators were the only people in Korea who really were [illegible] money" at that time.

I was not surprised. Train schedules then were limited and bus service infrequent. Truck drivers thus could charge good prices for carrying innumerable passengers on top of their loads, a practice apparently tolerated by their employers.

Inflation Hard on Government Workers

In Korea I found the same inflation pattern that I had observed earlier in North Africa, France, and Italy. Inflation here is not so serious as in China, but uncontrolled prices, in terms of won, the local currency, have increased a thousandfold in less than ten years.

In the middle of 1948 the purchasing power of the won corresponded to more than 600 to a dollar, though the official rate of exchange was 50 won to a dollar. Few dollars, I was told, were exchanged at the legal rate. Private transactions between Americans and Koreans were generally based on cigarettes, soap, candy bars, whisky, and beer.

Although illegal, such transactions helped [illegible] women and children make a living. Hawkers profited a few hundred won a day by selling these black-market goods openly in the street.

Some inflation still exists. The official rate has since been raised to 900 won to the dollar, and unofficial transactions go on at a rate as high as 3 500 to 1.

Another effect of inflation, since corrected to some degree, was the plight of people with fixed incomes. This was especially true of Korean Government employees. Taking into account the basic food purchased at controlled prices, a man's salary often had a purchasing power insufficient to feed a family, even by Far Eastern standards.

How some of the Government employees subsisted was a mystery to me. Apparently some accepted bribes, some dug into capital, some held several jobs, while others were probably just starving. I saw several instances of serious underfeeding among the geologists and surveyors employed by the Geological Survey. They were either too honest or too proud to go in for briberies or the black market.

Bride's Face Masked with White Powder

[illegible] through South Korea I visited the town of Wonju. My host was [illegible] United States Army [illegible] Korean constabulary regiment. He had been invited to the wedding ceremony and banquet of a young Korean officer, and he took me along.

It was a typical upper-class marriage, which followed many old customs but was influenced by the newer Western ideas. As a concession to these ideas, the bridegroom had known the bride socially for a long time.

The bride wore a beautiful silk costume consisting of a bright-red skirt and green blouse, with bands of yellow and red on the big flowing sleeves. Her face was heavily masked with a thick white powder. Her shiny hair was topped by a multicolored beaded crown. Long, flowing, jewel-studded ribbons hung down her back. The blank expression on her face never changed throughout the elaborate ceremony.

Instead of the fancy Korean costume which is usual for the man, the bridegroom wore a new American-made uniform.

After the rites the bride disappeared with

the female members of the family, and I never saw her again. We followed the bridegroom to his quarters, where we joined in a banquet for men only.

In keeping with old custom, which varies now and then, the bridegroom stays with his bride for three days in his father-in-law's house before returning with her to his own parents' house.

Real manhood begins only after marriage. Even if he is 70, a bachelor's opinion has little influence. Because of the belief in Confucianism and spirit worship, the Korean's aim in life is to have as many children as possible, especially boys, so that the family will continue and his descendants will worship his spirit.

This practice, however, can cause hardships. A well-educated friend of mine in Seoul had been compelled by his family to marry at 19 since he was an only son. At 22, besides a wife and two children to support, his family included a mother, grandfather, grandmother, and great-uncle—none of whom was a breadwinner.

My friend was a Government employee, and his upbringing prevented him from doing manual work, which would have brought better wages. The family had made ends meet only by selling heirlooms and by extra money he took the husband got as interpreter and middleman for the GI's. He looked grimly into the future, and his outlook on life was that of an old man.

Communists Short-circuit Power Line

During my sojourn in Korea there were, pure-especially, few Communist disturbances near the border between North and South Korea. But Communist agents and troublemakers were busy on the island of Cheju and in the southern Province of Cholla.

While I was at the Hwasun coal mine near Kwangju one afternoon, the American adviser told me that Communist trouble was expected that night.

After sundown his Japanese-built house was crowded with the Korean manager's and assistant manager's families, who felt safer in an American house because, from what I heard, the Communist policy at the time avoided as far as possible harming American citizens.

Suddenly the lights went out. Communists had thrown a chain across the high-tension power line. We passed part of the night on watch with our carbines handy.

I was given the task of watching the side of a hill close to the house. It was late June and I could see faint lights on the hillside. One excitable member of our group was certain that they were glowing cigarettes smoked by Communists while waiting for a general attack.

But the lights were only fireflies! Reassured of this, everybody felt much better, and I went to sleep. Throughout the night there was some shooting in the vicinity between Communists and Korean police.

August 15 Korean Independence Day

By the beginning of July, 1948, the duties and activities of the U. S. Military Government were gradually being transferred to the Korean administration. Formal proclamation of Korean independence was set for August 15.

Throughout the week prior to that promised day, Seoul became busier than usual. Crews feverishly repaired the pavements of the main avenues; others were building colorful arches of triumph with big signs in both Korean and English, "Long Live the Republic of Korea," and "Welcome General MacArthur."

Fortunately, the big day was beautiful and sunny, though very hot. By early morning the capital was in a turmoil, and long lines of school children, youth organizations, and clubs prepared for the parade. Orchestras and bands, both Korean and Western, played gay tunes. Flags and banners decorated every building (page 778).

The main avenue leading to the capitol was lined with constables and impressive mounted police carrying red lances. A dense crowd representing a cross section of all Korean classes of society jammed into the spacious court of the capitol and lined the avenue leading to it.

By 11 o'clock the platform which had been especially erected for this occasion was filled with the high officials of the new Korean Government, headed by President Syngman Rhee, Lt. Gen. John R. Hodge, the commanding general, and his staff, the United Nations Mission, and accredited consuls. I did not see any Russian uniforms. White jeeps driven by American MP's were constantly patrolling the avenues.

Half an hour later an impressive parade of armored cars, staff cars, and jeeps approached the capitol. General of the Army Douglas MacArthur, accompanied by Mrs. MacArthur, stepped briskly out of a staff car and mounted the podium. Wild applause greeted the speeches of President Rhee, General Hodge, and General MacArthur.

After 1 p.m., General MacArthur left Seoul for the airport and returned to Japan. The rest of the day the Korean crowd paraded the streets. Artistic and often humorous floats

Women Reel Shimmering Threads from the Silken Chambers of Insects

Dress in Saris and Stoles for a Festival

Lone Drying Laundry, Kentucky Tobacco Farm on Rugs Lines

Man and Ox Wrestle in a Piece of Mud Thrown a Rice Field. Spring Plowing Gets Under Way North of Seoul

Soggy Dummy Dead Newspapers Is Washed in Streams, Rolled into Sheets and Dried Against Walls for New Editions

[illegible] North Korean [illegible] by [illegible] (Wide World Photo)

The Dear Homes Less than 250 Miles Long Becomes a Deadly River as It Sweeps Past Flatlands near Sand

Heavy Rains on Denuded Mountains Often Turn Korean Rivers into Bridge-Shattering Torrents

Babies Ride the Rumble Seat When Mothers Shop for Groceries in Seoul

[illegible]

and big paper dragons were mounted on trucks and horse-drawn carts. Every Korean face shone with pride and happiness. Korea had again become a sovereign nation.

In the afternoon President Rhee held a reception at the former residence of the Japanese governor general, which had also been used as living quarters by General Hodge. White-robed Dr. Rhee, and Mrs. Rhee, a charming Viennese woman in Korean dress, graciously greeted the long line of Korean officials and Americans.

Flood Damages a Lignite Mine

At the end of August I was sent to Kyongsang Pukto and Kyongsang Namdo, two large Provinces in the southeast, with instructions to investigate the bottleneck at the lignite mines there. Gasoline and power shortages had substantially reduced their output.

On this trip I visited the town of Kyongju, capital of the old kingdom of Silla. This kingdom reached a high civilization in the early Christian era. Many relics of this civilization are found in and about the town. I was especially impressed by the huge mound tombs for kings and princes, now covered with twisted pines.

The temple of Sokka Yural is simple, with pure lines and arches made of huge blocks of granite set without mortar. There is also a large subterranean room roofed with a cupola made of granite blocks. This room was formerly used for the storage of ice. Near these monuments stand the well-preserved remains of a tower which was used as an observatory.

Rain had been falling constantly for two days when we arrived in the evening at the Yongji lignite mine in a flat valley five miles from the Sea of Japan. All night rain beat a deafening tattoo on the tin roof.

The next morning I looked out the paper window and saw that the near by stream was almost flush with its protecting dike. Tree trunks, roots, and sometimes cows and hogs were floating by.

Realizing the flood danger, I asked the mine manager if it would not be wise to move my trains. He seemed a little annoyed at my anxiety and suggested that we first have breakfast. However, I persuaded him to have my sleeping bag and suitcase put in my truck.

Later we went to the assistant manager's house for a substantial Korean breakfast. In the middle of the meal several women, children, and dogs came scurrying through the dining room. The dike had broken and flooded the kitchen.

The men rushed out to patch up the broken dike with sandbags. Unsuccessful in this attempt, we waded waist-deep through the strong current to high ground.

We got in our cars and drove to the near-by port of Kuryongpori. Only a few minutes after we crossed a bridge over the irrigation canal it was swept away. At the mine nobody was drowned, but extensive damage was done to the mine itself, with considerable loss of personal property. In the upper valley, unfortunately, four people were drowned.

At the port of Kuryongpori we saw fishermen pulling their craft out of the water to high ground. A typhoon was coming from the south, but by the time it struck Kuryongpori it had lost most of its strength. A few roofs were blown off; there was little other damage.

I found myself blocked for four days in this attractive corner of South Korea until the flood subsided. There was no decent inn in the place, but through Mr. Kim, the mine manager, I was invited to the home of a dried-fish trader and agent for the salt monopoly.

Fishing is an important industry here. Sardines, herring, tuna, flounders, cod, [illegible] crabs, anchovies, abalones, and huge [illegible] are a few of the many fish and sea foods that abound along this coast. The meat of the abalone makes fine eating, and the beautiful shells are used by the Koreans in inlaid lacquer work.

Eager Buyers Snap Up Whales

Whaling is also important. Koreans are fond of whale meat, which looks like beef.

A few months before, I had seen a 75-foot whale caught near the port of Pohang. Twenty minutes after it was pulled in to the dock the whale was practically gone. Buyers were snapping at the chance of having fresh meat at an advantageous price.

During my four days in Kuryongpori I examined some interesting outcrops of lignite, did some oil painting, and went swimming with my Korean friends. We took food, drinks, and watermelons to the splendid beaches.

On the fifth day scouts sent on foot by Mr. Kim brought word that the rivers and creeks again were low enough, but bridges and sections of the road were washed out.

Fortunately, our Army three-quarter-ton truck with a winch in front was an ideal vehicle for use on such unpredictable roads. It took us seven hours to make the 15 miles from Kuryongpori to Pohang. Often we had to follow the river bed to avoid huge boulders and soft sandy spots.

Using front-wheel drive and the winch, we managed to get out of the river bed onto the undamaged sections of the road. It was a real relief finally to get back to the provincial

Budding Artists Draw American Scenes as Young Koreans Study the U. S. A.

[illegible] Mary [illegible] Nevin [illegible] Mary [illegible] in Korea. The [illegible] in Korea. [illegible] in an experimental teacher training school at Seoul.

[illegible] way. A few bridges had been washed out but traffic had already been resumed.

One Sunday I was invited by a Korean friend [illegible] Koreans love to spend the day in a good [illegible] spot, eating and drinking.

We arrived by truck at the foot of the mountain in the early afternoon and climbed through a beautiful wooded section to a Buddhist temple. The path was lined with piles of small stones, [illegible] to appease malevolent spirits of [illegible] mountain.

Kisang Girls Sing at a Picnic

After half an hour of steep walking we arrived at a quaint old Buddhist shrine attended by a monk and half a dozen acolytes. On the veranda of a small pavilion at the side of the shrine, the wife of my host with her maids was already preparing food which they had brought up an hour before. Also four kisang girls from Ulsan were there waiting.

The party consisted of seven men. First came the Korean meal and usual routine of toasts. Later the kisang entertainers sang [illegible] Korean folk [illegible] accompanying themselves on the typical Korean [illegible] triangle-shaped drums.

Koreans are musical people and their music, which was influenced by the Chinese, is not so harsh as that of the Chinese or Japanese. Constantly a minor is popular. Every American who has been in Korea knows the dreamy result in endless romantic love song.

Korean orchestras play not only near native music but many Western tunes. In the latter they have an excellent sense of the melody but not of the rhythm.

The Korean folk dances are highly symbolic and not always easy for a Westerner to follow (pages 538, 539).

We left before midnight, walking back down the trail lighted by a faint moon, singing and listening to crickets and night birds.

Necks Crane as Sound in Holiday Mood, Chosen a Harvest Festival "Swing Queen"

Belching Smoke, Yongsul Foods Power-Company South Korea

[illegible] Korea [illegible] ECA [illegible] new hydro and [illegible] the country in smoke. New equipment [illegible]

When the time came for me to leave the country, I found out how precious a prize is an American automobile.

A month after my arrival I bought a car from a colonel who was returning to the States. For his 1940 Hudson I paid $980.

As soon as it became known that I was leaving, Koreans insisted I demand [illegible] for my car. They offered [illegible]

I told them that according to Army regulations my car could not be sold [illegible] the Provost Marshal to American personnel, [illegible] more than I had paid.

To a man who was partly [illegible] insistent, I added that I could not make out a bill of sale if I sold the car to him and that he could be thrown in jail if the police found it in his possession.

"[illegible] were," he [illegible]. "The day before you leave Korea you declare that your car has been stolen. By that time it will be over the 38th parallel [illegible] and no one will see it again.

Naturally I declined [illegible] and I got my money back by selling the car to an American friend. Later I was [illegible] equivalent of [illegible] the Russian Zone.

During the month I spent in South Korea hundreds of cars, trucks and trucks were stolen. Many of them were recovered by American MP [illegible] police. An automobile not carefully watched was the prey of [illegible] who stripped it of [illegible] tires, and all movable equipment if unable to drive it away.

All in all, there never was a dull moment in this "Land of Morning Calm."*

* [illegible] Mountains [illegible] Korea [illegible] Mountains [illegible] Cumulative Index [illegible]

Lightning in Action

By F. Barrows Colton

LIGHTNING, with its terrible destructive power, has been rightfully feared by man for countless ages. For most of that time he was helpless against this terrifying attack by Nature's forces.

But today this age-old enemy is being at least partially tamed.

Lightning is as dangerous and unpredictable as ever, but much of the death and damage it used to cause is now prevented by knowledge of its behavior.

This "taming" of lightning has come about through better understanding of what lightning really is and how it works.

The old Greeks thought that lightning strokes were flaming spears that their god Zeus hurled down at his enemies from the clouds above. Most of us still think of lightning as "striking" down at a man or building from the sky.

But one of the new things that has been learned about lightning is that it may actually "strike" upward from the ground. This is because lightning is really a high-speed flow of current back and forth between powerful electric charges that have accumulated not only in the thunderhead but in the ground below it.

It is the current flowing up out of the ground that probably does the damage; in other words, that "strikes" (pages 812-813).

Knowing this fact has not enabled us to control lightning, but it has aided in showing how to avoid lightning's dangers.

Bolts Play Strange Tricks

Lightning plays strange tricks. Once it struck and set fire to a house, then leaped to a nearby fire-alarm box, set it off, and summoned the engines!

A New Jersey farmer sat reading under a lamp in his home. Lightning lashed along the wiring and singed off his hair to within a quarter of an inch of his scalp, but did him no other harm.

Two boys were struck while they slept in a tent beside a lake in Maine. They awoke to find their legs paralyzed from the waist down, their feet, legs, and sides burned, and an ax blade between them melted. Eventually the paralysis in their legs passed away.

In Minneapolis lightning threw a typewriter up from a table and imbedded it in the ceiling. A closet door was torn off and hurled to the roof outside. A dresser was shattered but one drawer remained undamaged and was driven between the springs and mattress of a bed in which two girls were sleeping.

All these and innumerable other antics of lightning can be explained if you remember that lightning is an electric current.* At the end of the stroke it always tries to find a path of least resistance. That's why it follows wires, jumps to metal objects, and sometimes goes through people who happen to be in its path. Flesh offers less resistance than air, which is not a good conductor.

Odd Facts About Lightning

Here are some other facts about lightning:

A true chance of being killed by lightning in the United States is about one in 365,000.

Lightning can and does strike not only twice but many times in the same place. It has hit the Empire State Building in New York City as many as 12 times in 20 minutes, and as often as 50 times a year (pages 823 and 827).

One of the safest places you can be during a lightning storm is in your car, if it's an all-steel closed model, as are most modern ones. If the car is struck, the steel body will conduct the current away from you (page 821). Equally safe, but less practical, are the insides of your furnace and mechanical refrigerator for they're all metal, too!

Lightning rods don't keep lightning from striking your house or barn. But if lightning does strike a properly rodded building, the rod system carries the current harmlessly to the ground, without fire or other damage.

If lightning strikes an all-metal airplane, such as those in general use on commercial airlines today, the people inside will not be harmed. There is no known case of lightning directly causing an airplane accident (pages 818, 819).

Lightning strokes between two clouds actually are far more frequent than between a cloud and the ground. In such a case one cloud carries a negative charge, the other a positive one. Lightning also can occur inside a single cloud, between the negative charge in one part of the cloud and a positive charge in another.

Power enough to supply a large city, hundreds of thousands of amperes, may be contained in a single lightning stroke. The most powerful stroke ever recorded in the United States hit the Cathedral of Learning of the University of Pittsburgh on July 31, 1947. It discharged a current of 345,000 amperes, or

* See "The Fire of Heaven (Electricity)," by Albert W. Atwood, National Geographic Magazine, November, 1948.

Mains Broke, Gas Burned, and a Car Fell into the Subway When a Bolt Struck in Brooklyn

[illegible]

enough to light more than 30,000 [illegible] bulbs for the duration of the flash. This vast power, however, is turned on for only about [illegible] of a second.

Lightning strokes between a cloud and the ground may be three miles long or more. Between two clouds they may flash over a distance up to 10 miles. [illegible]

Franklin and His Famous Kite

Ben Franklin, when he flew his famous kite in a thunderstorm in 1752, probably collected [illegible] kite string [illegible] at the lower end. [illegible]

The electric sparks [illegible] of the key were most probably produced not by lightning itself but by the discharge of [illegible] charges in the air, a condition that goes with a lightning storm. [illegible] from Franklin's time [illegible] lightning is electricity and that a [illegible] of lightning rod will protect buildings from damage.

Lightning is very hot. Some strokes [illegible] generate a temperature [illegible]

You can [illegible] estimating how far away a lightning flash is by counting the seconds between the flash and the noise of the thunder.

Light from the flash reaches you almost instantaneously, but the sound of thunder travels only about 1,100 feet a second. If you count five seconds between flash and thunder, the lightning was about 5,500 feet, or one mile, away.

My grandmother used to say that thunder came from clouds bumping together. Today the [illegible] knows that it [illegible] noise produced when the lightning current suddenly expands [illegible] of the air as it [illegible] through them.

These [illegible] when a storm is at its [illegible]

A Heavy Bomb Could Scarcely Do More Harm than the Bolt Which Struck Here

Lightning is believed to have penetrated this Columbus [illegible] bridge [illegible] damage. One person was killed, [illegible]

lightning striking the ground near by. The rumbling, booming kind of thunder comes from strokes to the ground at a distance.

Thunder cannot be heard more than about 15 miles, [illegible] farther. Some lightning strokes produce no thunder. They are those lasting 1/10 to 1/20 of a second instead of the usual few millionths. They do not [illegible] down the air [illegible] to make an explosive noise.

Some people who are struck by lightning [illegible] bodies are charged with electricity.

As a rule, the lightning current passes instantaneously out of the body of the victim into the ground. [illegible] killed [illegible] respiration.

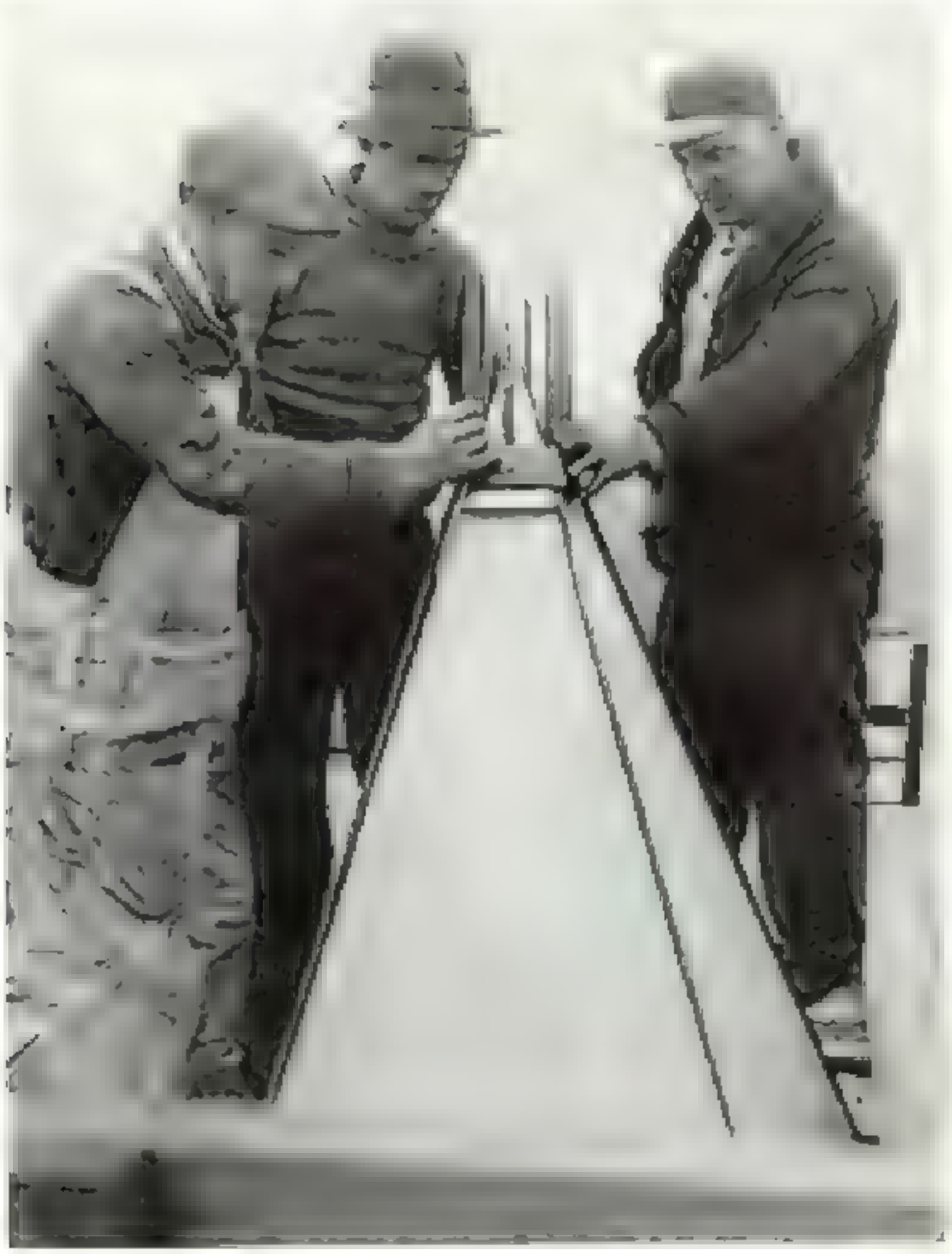
High-voltage electric current passing through the body often paralyzes the nerves and muscles controlling the breathing [illegible] breathing mechanism. Artificial respiration keeps the victim breathing until the paralysis passes away. Lightning victims are not usually burned [illegible]

Fertilizer from the Air

Lightning does some good, too. It manufactures natural fertilizer [illegible] each year. Air consists of [illegible] Lightning discharges [illegible] the nitrogen and oxygen [illegible] Much [illegible] comes down [illegible] the soil.

Fertilizer manufacturers have used the same method to get [illegible] from the air, by discharging electric sparks continuously, a far more efficient method than Nature's haphazard way.

Over the earth as a whole, it is estimated



Eight Lightning Rods Guard Washington Monument's Top

[illegible]

[illegible] that there are [illegible] lightning flashes every second. In the United States alone about 400 people are killed annually by lightning and around 1,500 more injured."

[illegible] in the United States [illegible] and over [illegible] in losses for fires caused by lightning. Nobody knows how much more was lost in unreported and uninsured fires. Lightning stands fourth among the causes of all fire claims.

Lightning is the leading cause of farm fires and in rural areas [illegible] of the deaths and injuries from lightning occur in the country. That is because the crowded [illegible] offer [illegible] from [illegible] water and heating pipes that act like lightning rods to carry current to the ground. If a house is struck, resistance is less through [illegible] than there's [illegible]

How Nature Produces Lightning

Just how Nature produces a stroke of lightning is [illegible] well understood. [illegible] the object [illegible] since [illegible] significant [illegible] investigations [illegible]

[illegible] when [illegible] currents are [illegible] start to fall. [illegible] cloud, turbulent [illegible] are moving up and down at [illegible] the same rate [illegible] the [illegible] charge [illegible] the lower part [illegible] Dr. H. Hayes [illegible] of the General Electric [illegible] High Voltage Engineering Laboratory [illegible]

This charge [illegible] the ground [illegible] equal [illegible] As the wind blows the thunder cloud [illegible] flows down below.

Positive and negative electric charges attract each other. The charges in the

[illegible] Photo [illegible] Washington Monument [illegible] Service [illegible]

ground and cloud try desperately to come together, but the air between them prevents this at first, because air is not a good conductor of electricity. As the charge in the earth moves along, it [illegible] chimneys, and people in its path in an effort to reach the cloud.

Soon the charge in the cloud begins to send down a short spurt or "leader" stroke toward the ground. This shoots down about [illegible] feet below the cloud, breaking apart, or "ionizing," the atoms of air in its path. When air atoms are broken apart this way, they suddenly become better conductors of electricity.

Following the path thus made the leader flashes downward by steps. Meanwhile, the positive electric charge in the ground is being "attracted and concentrated" by the downward-flashing leader. Finally when the leader almost reaches the ground, the ground charge may send up a leader of its own, a single or multiple streamer, to connect with the leader coming from the cloud. All this happens in a hundredth of a second, more or less.

Lightning's Passage Leaves Sand Tube Hollow Tubes

Known as fulgurite, [illegible] made when lightning [illegible] sand, extreme heat [illegible]

Suddenly the leaders from the cloud and ground push down and up far enough to meet. An unbroken pathway of ionized air now extends from cloud to ground. Then, along this path, a terrific flow of current rushes from ground to cloud. This is the lightning flash you see, and it is probably what does the damage.

This stroke follows a path of ionized air that may be as thin as a hair or about [illegible] wide. After the main stroke, several other minor ones may rush up and down this path between cloud and ground, but so fast that to the eye they all appear as part of the original flash.

Lightning's [illegible] to flow between cloud and ground explains most of the seemingly freak things that it sometimes does. It is more likely to strike tall objects, such as trees, barns, or steeples, because they furnish a shorter path between cloud and ground.

Lightning smashes brick chimneys, furniture, wooden walls, and plaster because such materials offer resistance to its progress. In forcing its way through them, it builds up internal pressures that expand outward with [illegible] force. Trees ripped apart by lightning are literally blasted by gases formed [illegible] the wood [illegible] pressure

Lightning Rods Guard 23 Mount Vernon Trees, Including the Planted by Washington

[illegible]

Lightning rods of today are not the tall spindles ornamented with glass balls that you sometimes still see on farm buildings. They are short metal spikes, all connected to copper or galvanized-iron cables that lead down the sides of the building and go into the ground deep enough to contact soil that is permanently moist.

If lightning rods are placed on a building that contains other metal, such as a forage or hay-loader trolley in a barn, electrical lightning wires, plumbing, etc., all these are bonded to the rod system.

Any steel frame structure, such as a skyscraper, is a lightning rod in itself. A lightning bolt striking it is automatically carried harmlessly to the ground by the steel. There should be a metal connection between the outside of the roof and the frame, however, so that lightning will not damage the roof in making its way inside to reach the steel.

Rods Protect Even Trees and Monuments

Lightning rods are used to protect historic and valuable trees, and many important monuments are equipped with them, including the Statue of Liberty in New York Harbor and the Washington Monument (pages 812 and [illegible]).

During World War II ammunition factories were specially guarded against lightning. Local Weather Bureau offices kept them informed of the approach of thunderstorms. Patrol cars also often scoured the countryside equipped with radio to warn of storms.

When a storm came close, operations ceased until the danger was past. Even if lightning did not strike the factory, there was danger from the static electricity existing in the atmosphere, which always accompanies a thunderstorm.

"St. Elmo's fire," which sailors used to think was a portent of disaster when they saw its eerie glow on the tips of masts or spars, actually is a warning that conditions are ripe for a lightning stroke.

It shows that electrical charges have built up in the clouds overhead and the ground below, and that the charge in the ground is so strong that some of it is "leaking" off in visible form. The charge flows off most easily from a high, sharp point such as a steeple, mast, or flagpole, but it may appear almost anywhere.

Two boys riding horseback suddenly noticed that each other's heads and the rumps of their horses were outlined by the glow of St. Elmo's fire.

Though harmless, St. Elmo's fire has been regarded with superstitious awe by sailors, as in Coleridge's *Rime of the Ancient Mariner:*

> About, about, in reel and rout
> The death-fires danced at night.

Others have believed it to be a weather indicator. Longfellow's *Golden Legend* says

> Last night I saw Saint Elmo's stars,
> With their glimmering lanterns, all at play
> On the tops of the masts and the tips of the spars.
> And I knew we should have foul weather today.

Since a lightning storm is certainly "foul weather," the old belief was not so far wrong.

St. Elmo's fire sometimes is seen on the wing tips and propellers of airplanes, where it is a sign of a special kind of trouble. It means that an electrical charge has built up on the airplane and in flowing off is causing such severe radio static that the pilot cannot communicate with the ground or other planes. Today this is largely overcome by metalized cotton cords that conduct the discharges off into space without causing static.

A Few Rules of Safety

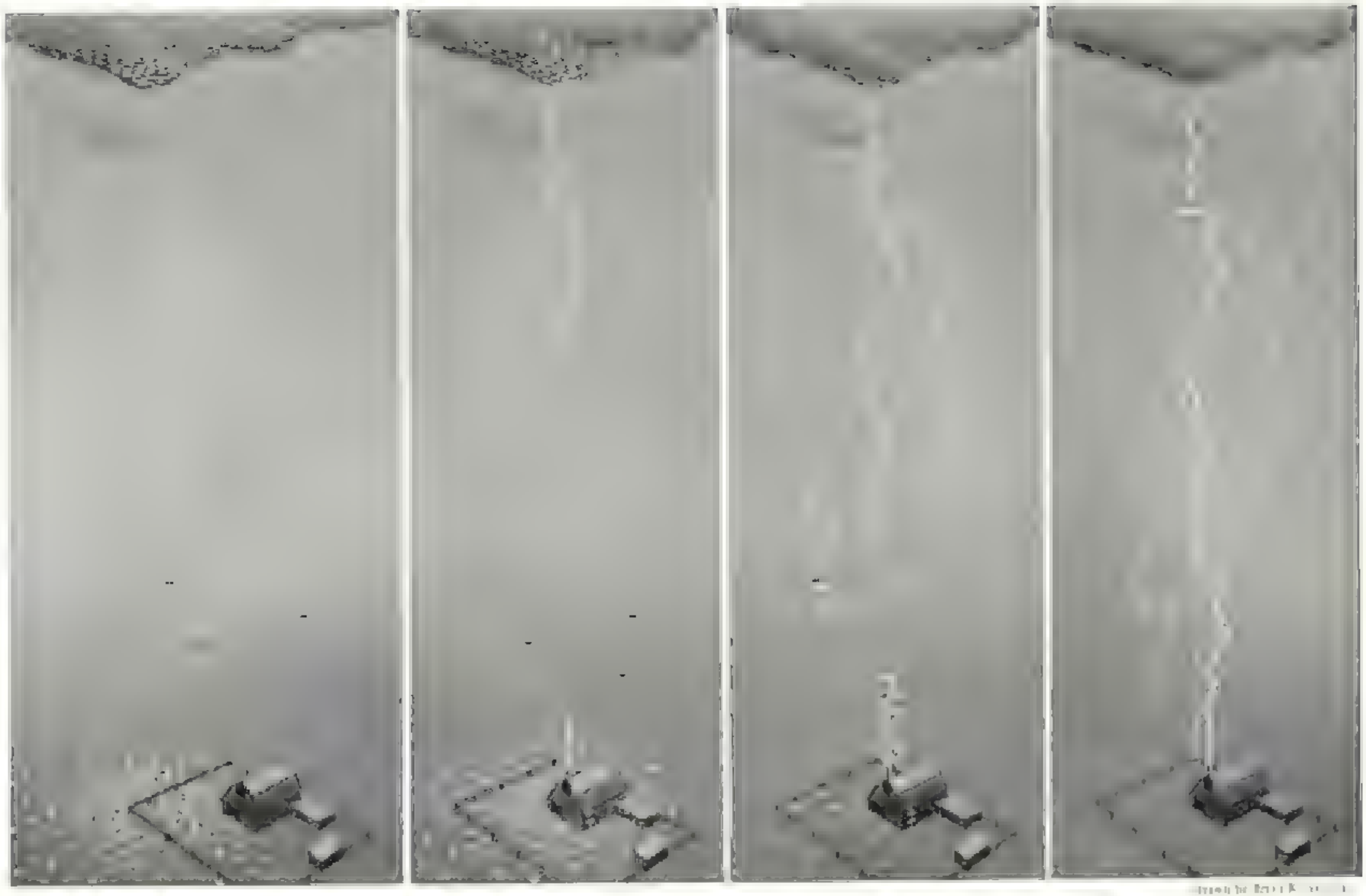
Much of the death and injury from lightning could be avoided if people kept in mind a few rules of safety.

Most important: get indoors, in a house, barn, or whatever building is handy, the bigger the better. Roofs and walls of buildings usually provide an easier path than the human body for lightning to follow to the ground.

When a thunderstorm threatens, keep away from beaches, fields, golf courses, and other open places. Don't go in swimming, for you may be electrocuted by lightning current that has traveled through the water from some distance away. Even if it only stuns you, you may drown. Don't ride a bicycle or horse, or operate an open machine such as a tractor.

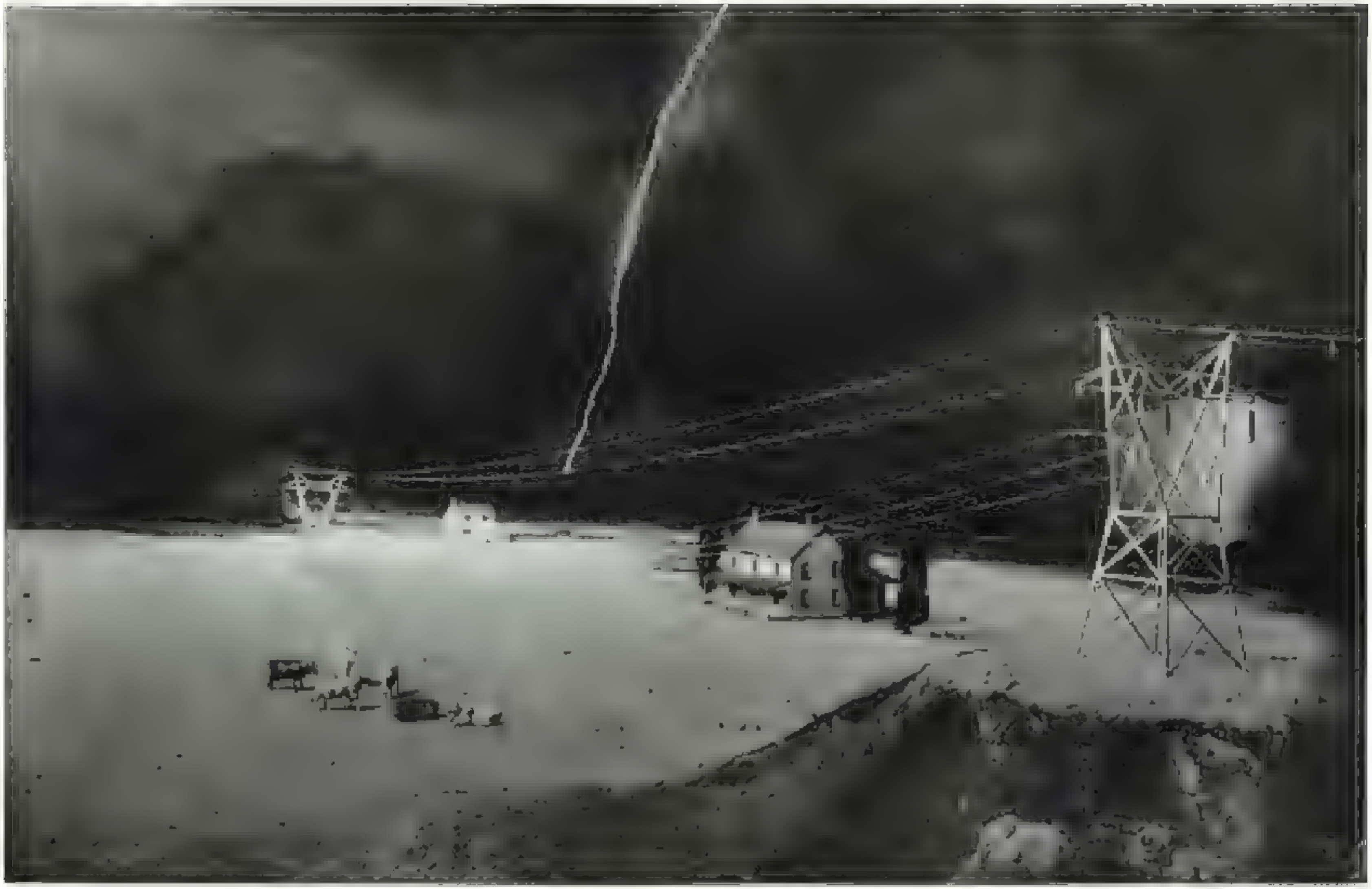
Keep away from exposed hilltops, high masts, and isolated tall trees. A tree or similar object is a triple threat. If the tree is struck, the lightning may jump from it to your body; it may enter your body from the ground after striking the tree; or the tree may explode, injuring you by flying fragments. Don't go near wire fences, or other wires. Lightning may travel long distances along barbed-wire fences, far from the place where it originally struck. Livestock often is killed this way.

Indoors, the center of the room is about the safest place. Closing the windows will not stop lightning from entering. Since the chimney is usually the highest part of a house, lightning may strike there and follow down into the fireplace or stove; therefore, those are good places to avoid. Wiring systems and



How Lightning Strikes: Electric Charges in Earth and Cloud Make Contact, Sending Heavy Current Through the Barn

[illegible]



Man-made Lightning Striking a Model Power Line in a Laboratory Shows How Overhead Wires Prevent Damage

[illegible]

Through Lightning Strikes Within Inches, Passengers Are Safe in an All-metal Plane

[illegible]

Lightning Striking a Golf Green's Flagstaff Left Its Imprint on the Grass

[illegible] page 817) The weird mark was [illegible]

water pipes also make good pathways for lightning that strikes a house; so avoid the radio and electric light switches, keep away from radiators, and don't take a bath or shower.

All telephone lines entering buildings are equipped with lightning arresters, which reduce but do not eliminate the danger of using the phone during a lightning storm. It is better to postpone a call until the storm has passed, especially in rural areas.

If you do get caught away from shelter, out in the open, take refuge in a ditch or cave or under an overhanging cliff, rather than stay in an exposed place. If there is no shelter of any kind, it's safer to lie on the ground than to stand up. Getting wet is better than being struck by lightning. Wearing rubbers, incidentally, will not protect you from a lightning bolt.

A newspaperman in Greenville, Texas, struck by lightning lived to write about it in his paper. He was standing on a barn floor when a bolt knocked him unconscious. When he came to, he first felt that he wanted to die, then this feeling was replaced by a desire to live. He couldn't move or speak and had numb all over. When nothing remained, he uttered severe pain, which persisted for a long time in his bones, muscles, and nerves. He had burns on his face and body. His sports shirt was torn to shreds and the buttons ripped off.

In a national forest in Utah lightning struck in the midst of a herd of sheep and killed 835. The herder was knocked unconscious for two hours. In this case the sheep probably were killed by the stroke traveling from the ground up one leg, through the body, and down another leg. This [illegible] different more [illegible] of the current that the sheep [illegible].

Cows often are killed the same way.

Little Danger to Airplane Travelers

[illegible] planes, because, if they are struck, the metal skin [illegible] away from the pilots and passengers [illegible].

Darling Field participated in the thunderstorm project [illegible] by the U. S. Weather Bureau, Navy, and Air Force flew planes 1,363 times into the centers of thunderstorms to see what would happen. The planes were struck by lightning 20 different times, but the only [illegible] were radio antennas [illegible] small holes [illegible] rolled in wing tips, [illegible], and elevators [illegible] the need of [illegible] and Lightning Study [illegible].

Forked Lightning, the Storm God's Grasping Fingers, Seems to Reach for Prey

[illegible]

Lightning Cannot Harm the Driver Who Stays Inside His Steel Fort

[illegible] Westinghouse [illegible]

[illegible]

[illegible] I couldn't keep [illegible] from my ears. I heard what sounded like [illegible] My [illegible] from [illegible] to [illegible] miles per hour and [illegible] them.

Everything looked a bit fuzzy. [illegible]

[illegible]

[illegible] minutes after the [illegible]

Dr. Ross Gunn of the Weather Bureau made [illegible] flights through thunderstorms and his plane was struck three times. He found only slight marks where the lightning hit [illegible]

[illegible]

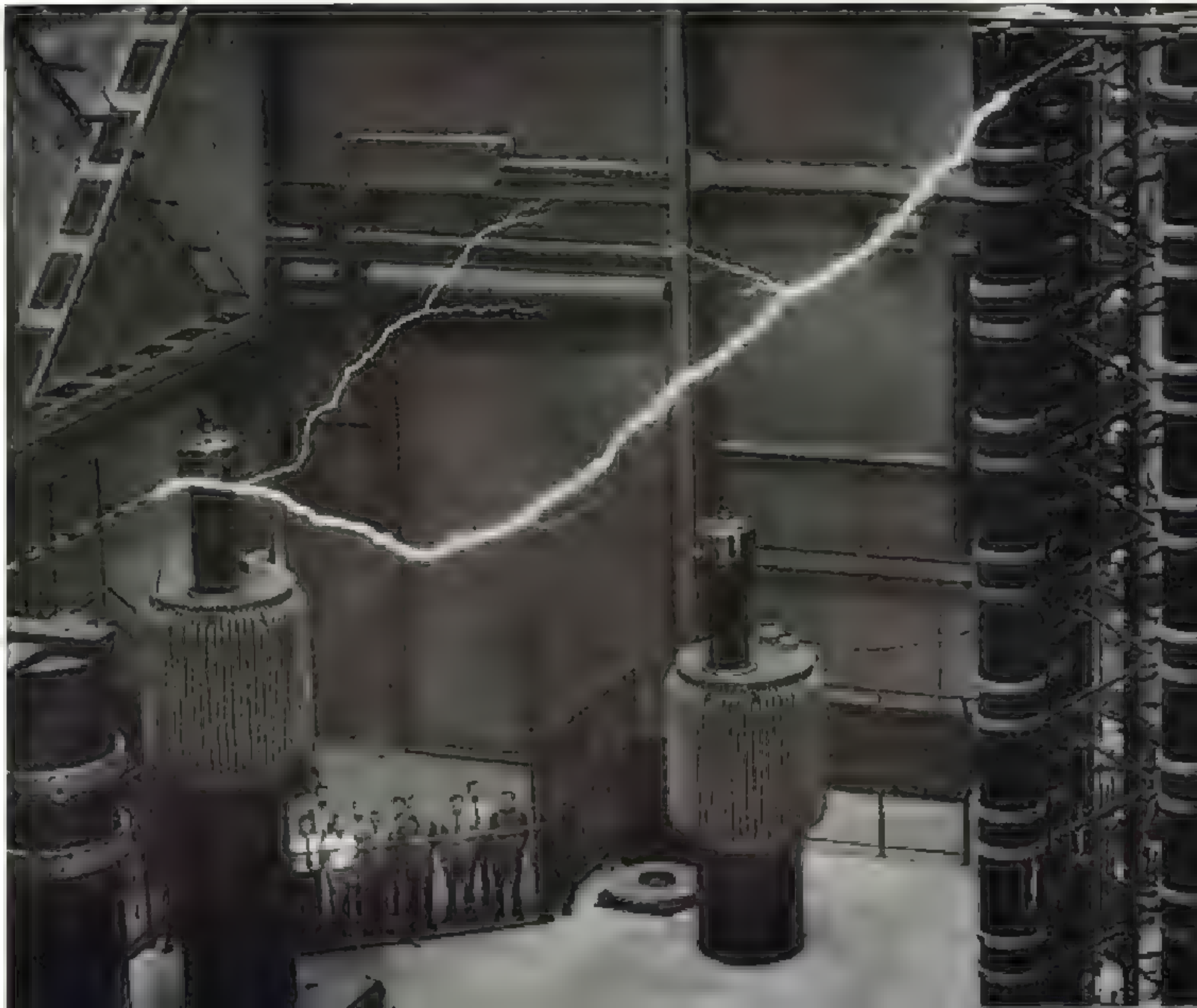
A Sailplane Pilot Sets Out to Ride a Turbulent, Updraft Elevator into the Sky

Lightning, Quicker than the Eye, Is Analyzed by the Camera. Eleven Strokes Appear as One

Ben Franklin's Kite String Was More Dangerous than He Knew

With a Lightning Protector, These Wires Will Meet Emergencies

Mars Midforest Bolt Leaps 50 Feet with Tremendous Roar



the national forests in the inaccessible mountains of the Pacific Northwest, lightning is a dreaded enemy. It starts about 6,000 forest fires in this country every year.

In the East, where rain more often accompanies or follows a storm, lightning causes only about 10 percent of the forest fires. But in the Northwest it starts three-fourths of all the fires, a far greater menace than careless campers (page 824).

In the central Sierra Nevada forests, one year, lightning started 100 fires every day for seven days.

Lookouts Guard Against Forest Fires

All during the summer thunderstorm season, fire lookouts anxiously scan the horizon for thunderheads. When the lightning begins to flash, they try to spot the directions of the places where they can see it strike. These places may need watching for days, for a lightning fire may smolder for a week in the dry duff of the forest floor before giving out a telltale column of smoke.

Fire lookouts in their exposed mountaintop stations sometimes have been struck and killed by lightning, but today the lookout's shack is the safest place on the mountain. The metal roof is bonded to heavy cables that run down the corners and out in deep trenches to a buried wire net or bed of salt. All metal objects, such as the stove and bed, are connected to the cable. The lookout avoids using his telephone while the storm is raging.

On one mountain in Idaho, appropriately named Heavens Gate, blue flames often play around the telephone circuit grounding wire during a lightning storm. Lightning running along forest telephone lines has been known to vaporize hundreds of feet of wire, leaving nothing but empty insulation strung beside the trail.

If the lightning starts a fire, the lookout calls for the air-borne fire fighters, who drop by parachute or land via helicopter close to the fire. Sometimes even then they're baffled, for the fire may be smoldering in a hollow or rotten treetop, invisible to men on the ground under the thick trees.

Lightning can be a menace to the fire fighters too. One man stopped to rest with a foot on the blade of his shovel stuck in the wet ground. Lightning hit a near by tree, jumped to the shovel, and knocked the man unconscious.

Since scientists can't stop lightning from striking valuable timberlands, they now are planning a new attack, against the source of the lightning. They plan to try dissipating thunderclouds with dry ice before the lightning ever gets started.

U. S. Forest Service officials, at the suggestion of Dr. Vincent J. Schaefer of the General Electric Research Laboratory, plan to drop dry ice from airplanes flying over the tops of upsurging thunderheads.

Dr. Schaefer says it is believed that thunderclouds would not accumulate the electric charges that produce lightning if the water droplets in them were not considerably "supercooled." He thinks that if a large degree of supercooling can be prevented by changing the water droplets to ice crystals, the cloud ceases to be a lightning factory, and lightning will not occur.

This can be brought about, he thinks, by "seeding" the cloud with small quantities of dry ice, the same method that he and Dr. Irving Langmuir discovered to produce snow and rain from clouds that otherwise refused to give up their moisture.

Most of our modern knowledge of lightning comes from research done by the big manufacturers of electrical equipment, such as General Electric and Westinghouse Electric Corporation. Lightning has been one of their big headaches.

Protection for Power Lines

In today's electrical age, the countryside is criss-crossed with electric power transmission lines, favorite targets of lightning strikes. Every mile of transmission line in some parts of the United States is struck by lightning on an average of once a year.

Lightning striking an unprotected transmission line may cause an interruption in the flow of electricity that can deprive a whole city of light and power for hours. A delicate surgical operation, on which a man's life depends, may be interrupted at the crucial moment. Electric refrigerators, clocks, elevators, factory motors, and innumerable other kinds of electrically powered equipment may fail, with potentially disastrous results.

Before lightning protection devices were in general use, some power lines had as many as 100 interruptions to service in a single year.

Lightning can interfere with a city's electric power in two ways. After striking a power line, it may travel along the wires and do serious damage to transformers, generators, motors, and other equipment. Or it may jump from the power line across an insulator to the steel tower and go to the ground. The regular power "juice" may follow the lightning current, leaking off into the ground instead of flowing along the line. The effect is the same as a heavy leak in a water pipe.

To avoid this, lightning arresters are installed. They operate like safety valves on

boilers, which stay closed until dangerous steam pressure built up. The arresters are connected between the power line and ground. The normal amount of voltage or electrical pressure on the line cannot open the safety valve to get to the ground.

But if lightning strikes the line, the voltage is suddenly increased. This opens the valve, and the lightning current is carried off to the ground without further damage to the line. At the same time, the arrester keeps the regular power current from following the lightning current to the ground.

Many power lines are protected by a special "ground" wire or wires strung along the lines some distance above the wires that carry the power.

These upper wires are grounded—that is, connected to the ground—at frequent intervals, and act as horizontal lightning rods. Lightning is more likely to strike them first and is carried off to the ground without doing damage (page 817).

Sometimes lightning may jump from the ground line to the power line. Then circuit breakers come into action and disconnect the line from the power source. After a fraction of a second, they are closed again, and power flow resumes. It all happens so fast that there is only a flicker of the lights and no noticeable interruption in the use of power equipment.

"Man-made" Lightning Produced in High Voltage Laboratory

Most of what is known today about lightning has come from experiments with the real thing and with "man-made" lightning which can be controlled and made to strike when and where desired.

Lightning strikes so often on the tower of the Empire State Building in New York City (pages 809 and 823) that General Electric Company engineers set up instruments there every summer, knowing they can count on having many strokes to aid their experiments.

High-speed cameras and oscillographs can record the lightning itself and automatically photograph the strokes and record the rise and fall of current during a flash. This research has shown that what appears to be a single stroke actually may be several (page 823).

General Electric's new High Voltage Laboratory at Pittsfield, Massachusetts, uses artificial lightning strokes up to 80 feet long, with a power of 15 million volts, for research.

This man-made lightning is produced in essentially the same way that Nature does

Lightning Gouged This 40-foot Trench

[illegible] were hoped [illegible] to [illegible] Florida in 1949. Film [illegible] to [illegible]

[illegible] two big electrical generators [illegible] place [illegible] (page 879).

[illegible] reproduce all the effects of natural lightning on a power line, although not to full scale. They even have made a portable lightning generator that they took out into the country and used to hurl lightning at real power lines [illegible]

As a result of all this [illegible] high [illegible] for electric [illegible]

Lightning has been classified into various types, though all really are essentially the

Lightning in the Offing Could Give a Man a Porcupine Hair-do

[illegible] Westinghouse Electric Corporation [illegible]

[illegible] Sheet lightning [illegible]

Sheet lightning [illegible] over a wide area, usually between clouds in the upper and lower parts of [illegible].

[illegible] lightning [illegible] "Ribbon" [illegible] and "forked" lightning are probably [illegible].

Many people have reported seeing [illegible] in the form of a [illegible] ball [illegible] [illegible] but some scientists think it [illegible] for several seconds by the eye after seeing a brilliant flash of [illegible] lightning. [illegible]

Lightning [illegible] volcanoes, dust storms, and snowstorms [illegible].

A good [illegible] lightning [illegible] Dr. Karl B. McEachron [illegible] General Electric.

"If you heard the thunder, [illegible] the lightning [illegible]. And [illegible] have already [illegible]."

New Northwest Map Completes the National Geographic Series of the United States

A NEW MAP of the Nation's great Northwest and neighboring Canadian Provinces goes to members of the National Geographic Society this month as a supplement to their June Magazine, completing The Society's detailed 10-color postwar series of the United States.

Members now have six sectional maps covering the entire country and much of Canada in great detail.

Wherever they travel in the United States or southern Canada, by road, rail, plane, on [illegible] and follow their progress on this accurate, up-to-date series of maps.

The usefulness of this map collection for all who travel, even by armchair, emphasizes anew the importance of preserving the NATIONAL GEOGRAPHIC MAGAZINE and supplements. All six maps have been issued with The Magazine since the war ended: Northeastern United States, in September, 1945; Southeastern, in February, 1947; South Central, December, 1947; North Central, June, 1948; Southwestern, December, 1948; and now the Northwestern section, June, 1950.

The one-sheet National Geographic map of the United States, July, 1946, gives a useful and popular over-all picture on the scale of 78.91 miles to the inch.*

Pocket Atlas of 43,935 Place Names

Altogether, the six sectional maps would cover an area of more than 30 square feet. They contain a total of 43,935 place names. Yet this whole compendium of carefully compiled geographic knowledge is of handy size, the folded maps fitting neatly into pocket, glove compartment of car, or plane cockpit.

For thousands of members who will explore the wonders of their homeland this summer, the maps will form a ready, dependable guide. Red lines show important automobile roads; black lines indicate principal railroads. National parks, monuments, and other features of scenic, historic, or natural history interest are emphasized; also such man-made changes as new [illegible]

These large, decorative, authoritative maps are widely used in business, schools, [illegible] government offices. They may be mounted on wall or desk, or preserved in the convenient map case available for filing National Geographic maps, four of which are issued each year as supplements to the NATIONAL GEOGRAPHIC MAGAZINE.†

Except for the densely populated Northeastern section, where the map scale is 1:1,750,000, or 27.6 miles to the inch, the entire country is mapped in this series on a uniform scale of 1:2,500,000, or 39.5 miles to the inch.

Larger scale insets provide greater detail on important areas in the two eastern sections and in the Northwest. The inset on the new map, "Northwestern United States and Neighboring Canadian Provinces," covers the vital Puget Sound region, from Olympia, Washington, to Vancouver, British Columbia, on a scale of 1:1,000,000, or 15.8 miles to an inch.

The main map covers all five States of the Northwest—Washington, Oregon, Idaho, Montana, and Wyoming, plus portions of seven more. It reaches north more than 300 miles into Canada to include the southern sections of three Canadian Provinces—British Columbia, Alberta, Saskatchewan, and a bit of Manitoba.

Huge Dams and Atomic Energy Plants

The vast area, one of the loftiest, most varied and scenic on the continent, stretches from the Queen Charlotte Islands to Lake Winnipegosis and south to Shasta Dam in California, Salt Lake City, Utah, and Rocky Mountain National Park in Colorado.

On the map, 36½ x 25½ inches, appear 7,317 place names; 109 commercial and military airports are indicated by red stars.

All the maps of this postwar series include the important new developments brought about by the war and reflect population changes in the light of the U. S. Census Bureau's official estimates. In these respects, no part of the country was so tremendously affected as this Pacific Northwest region with its enormous power resources and war-spurred industries.

* Members may obtain additional copies of each of the six maps in this series (and of all standard National Geographic maps, including the general United States map) by sending to the National Geographic Society, Washington 6, D. C. Prices, in United States and Possessions, 50¢ each on paper, $1 on linen. Index, 15¢. Outside United States and Possessions, 75¢ on paper, $1.25 on linen; Index, 50¢. Copies of the United States map enlarged to 67 by 44 [illegible] may be had for $2 each in U. S. and Possessions, $2.25 elsewhere. All remittances payable in U. S. funds. Postage prepaid.

† Bound like a book, 7½ x 10½ inches, with maroon fibrous leather covers. The Society's handy map case will hold 20 folded paper maps of standard size or 10 folded paper maps with their indexes. Mailed in heavy carton, postpaid, upon application to the National Geographic Society, Washington 6, D. C. [illegible] U. S. and Possessions; elsewhere, [illegible]

During the war and since, the Pacific coast has received the greatest migratory surge of population in the history of the Nation. Since the war the officially estimated population has increased 59 percent in Oregon, 58 percent in Nevada, 54 percent in California, and 49 percent in the State of Washington.

Such booming war industries as Seattle's airplane factories, Portland's shipyards, and Spokane's aluminum plants supplied the original impetus to this flood of people, but the movement has continued since the war. In Oregon, for example, the 34,100 businesses of V-J Day have increased to some 46,300.

Perhaps the most spectacular development is the great atomic energy establishment known as the Atomic Energy Commission Hanford Operations. Near these operations in Washington State have grown up the bustling atomic towns of Richland and North Richland with a combined population of more than 25,000. Now the Atomic Energy Commission is building another huge plant within the limits of this map, at Arco, Idaho.

Before the war not an ounce of aluminum was made west of the Rocky Mountains. Today nearly half of the country's total output is produced in Portland, Oregon, and in Tacoma, Spokane, and Vancouver, Washington, by electricity from the powerful Columbia River system.

More power is now being used from Bonneville and Grand Coulee Dams at peak periods than at the height of wartime production. Yet two more huge dams are being added in the area—McNary Dam, down the Columbia from Grand Coulee, and Hungry Horse Dam, in Montana on the South Fork of the Flathead River, a part of the Columbia system.*

The five States of Washington, Oregon, Idaho, Wyoming, and Montana have more than 20 percent of the Nation's developed hydroelectric power. In potential they contain 43 percent of the country's entire supply.

Grand Coulee's irrigation phase and O'Sullivan Dam, farther south, will irrigate some two million acres of semidesert land.

Logging Town Moves for Fifth Time

One of the world's best sources of timber is the Douglas fir forest, carrying the name of its most important species, which runs from the California-Oregon border north through British Columbia to Alaska.

Oregon and Washington together supply one-third of the country's total production of lumber and all of the softwood plywood, with the exception of California's seven percent.

In addition, their forests yield immense quantities of pulp for paper, and new wood by-products plants convert waste, such as sawdust, slabs, and edgings, into alcohol, tannin, fertilizer, cattle feed, and plastics. Sixty-five cents out of every dollar moving in these States has its source somewhere in the forest industries.

Shevlin, Oregon, foot-loose logging town of 100, is shown on the map in a new location. In 1947 it moved bodily for the fifth time in 26 years. Houses and stores were hoisted onto railroad cars for a 40-mile trip to a new stand of timber.

Wyoming Oil Well 3.9 Miles Deep

East of the Rockies, in Colorado, Wyoming, and Montana, promising discoveries of petroleum are being made, deep in the Cambrian layer, the earth's earliest sedimentary rock.

In Wyoming's new Pacific Creek field, the world's deepest oil well was drilled in 1949. It goes down 20,521 feet, or about 3.9 miles. Since 1940 Wyoming and Montana have more than doubled their oil production.

Canada has found extensive new sources of petroleum at Leduc, near Edmonton, at Golden Spike, 15 miles west of there, and at Redwater, north of the booming Alberta capital. Another field is at Hanna, 100 miles northeast of Calgary.

Almost entirely because of these dramatic new finds, Canadian oil production rose from 6.8 million barrels in 1947 to 11 million in 1948 and 22.1 million in 1949. Proved reserves have reached one billion barrels, and new discoveries are constantly being made.

To market Alberta oil, a new $90,000,000 pipe line is now being laid from Edmonton to Superior, Wisconsin. When finished early next year, this 1,150-mile line will be one of the world's longest.

A new development of major importance in this atomic age is the discovery of a huge supply of uranium ore in the Bear Lodge Mountains, north of Sundance, Wyoming.

Strewn over the map are picturesque place names, some eloquent of earthy pioneers and others of the Bible—Adam and Eve Rivers with Mount Cain between them, on the northern end of Vancouver Island; Three Fingered Jack, an Oregon peak; Crazy Mountains, Crazy Peak, and Loco Mountain, in Montana; Old Man on His Back Plateau, in Saskatchewan; and Sacajawea Peak, Oregon, named for the Shoshoni Indian girl who guided the explorers Lewis and Clark when they crossed this virgin empire to the Pacific less than 150 years ago.

* See "Montana, Shining Mountain Treasureland," by Leo A. Borah, in this issue of the National Geographic Magazine.

NATIONAL GEOGRAPHIC SOCIETY

GEOGRAPHIC ADMINISTRATION BUILDING
SIXTEENTH AND M STREETS NORTHWEST, WASHINGTON 6, D. C.

ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

To carry out the purposes for which it was founded, the National Geographic Society [illegible] in THE NATIONAL GEOGRAPHIC MAGAZINE articles [illegible] expended directly to promote [illegible]

Articles and photographs are desired. For [illegible] THE NATIONAL GEOGRAPHIC MAGAZINE [illegible]

In addition to the editorial and photographic [illegible] The Society has sponsored more than 100 scientific expeditions, some of which required years of field work to [illegible]

The Society's notable expeditions have pushed back the historic borders of the southwestern United States to a period nearly eight centuries before Columbus [illegible]

[illegible]

[illegible] Alaska [illegible] which are [illegible] date. [illegible] with a date which means November 4, 2011 B.C. (Spanish Chronology). It antedates by 300 years anything heretofore dated in America, and reveals a great culture of early American [illegible]

[illegible] in the National Geographic Society and the U. S. Army [illegible] needed to the world's highest record of 29,002 feet. [illegible] Albert W. Stevens and Lieut. Orvil A. Anderson [illegible]

The National Geographic Society [illegible] Bureau of Fisheries [illegible] and observed the solar eclipse of 1932. This was the seventh expedition of The Society to observe a total eclipse of the sun.

The Society has related with the Navy Department in deep-sea explorations off Bermuda during which a world record depth of 3,028 feet was attained.

The Society granted $25,000 and in addition $75,000 was given by individual members to the Government when the Congressional appropriation for the purchase was insufficient, and to preserve the great original trees in the Giant Forest of the Sequoia National Park. Thus these thereby saved for the American people.

One of the world's largest meteorite and glass [illegible] outside the polar regions was discovered in Alaska and [illegible] shown by Ansel F. West-Born while exploring for the Society with a Hubbard Expedition in 1931.


Romance
your love is
keeping for
a Hamilton
HAMILTON

Do you drink more coffee than you think you should?

Much as you love coffee, you know how the caffein in it can make people sleepless, nervous, irritable.

When you sleep poorly, or feel tense and jittery, you start thinking about the coffee you drink. Perhaps you should drink less of this tempting beverage. Perhaps you should stop [illegible] coffee altogether. You [illegible]

DRINK SANKA COFFEE

REAL COFFEE · 97% CAFFEIN-FREE

When you drink *Sanka* Coffee you [illegible] *real* coffee—marvelous tasting coffee [illegible] stop worrying!

For Sanka Coffee is two ways wonderful!

First of all, Sanka is delicious coffee. Rich and full-bodied, with the wonderful flavor—the satisfying, bracing cheer—that only *real coffee* can give you!

Second, Sanka Coffee is caffein-*free!* And that means nerve-*free!* You can drink all the Sanka Coffee you want without the [illegible] question about caffein effect.

For 97% of the caffein has been removed from Sanka. It can't possibly keep you awake, or make you feel nervous or cross! Why not [illegible] Sanka [illegible]!

Sanka Coffee

Real coffee with the worry taken out.
Drink it and sleep!

Products of General Foods

YOU CAN BE SURE...IF IT'S Westinghouse

A THING OF THE PAST!

One of our engineers vowed a great vow.

Never again, said he, will my wife have to go through the ancient and accepted method of defrosting.

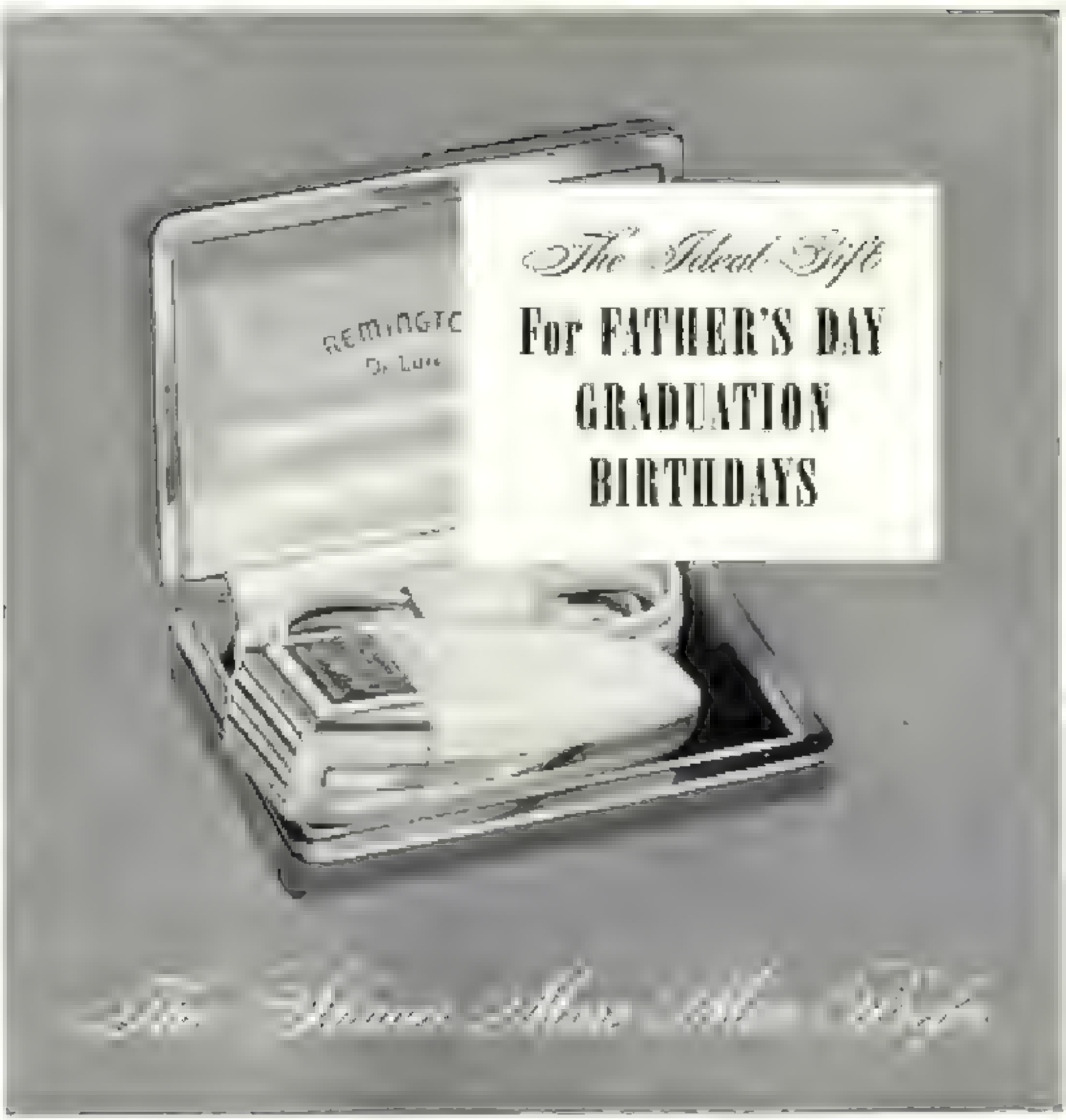
It doesn't make sense, said he, that in a country smart enough to put refrigerators in every kitchen, women should have to go into defrosting conception by-laws because nobody ever really decided to prevent frost getting started.

Out of that vow came the new Westinghouse "Frost-Free"* Refrigerator.

That name is literally true. Frost *doesn't get a chance* to build up in this refrigerator—because automatic things happen. And they happen so frequently and so fast that frozen foods and ice cubes stay solid throughout all. No drippy trays to empty, no dials to set, no thermometers to watch. Efficiently and smoothly, the temperature is maintained at an even level that assures longer life, greater economy and safer, better foodkeeping.

Hundreds of thousands of kitchens are going to be blessed by their mistresses' belief in the words we live by—You can be sure . . . if it's Westinghouse.

WESTINGHOUSE ELECTRIC CORPORATION • • • PITTSBURGH • PA.



[illegible] Father's Day, Graduation, Birthdays, for every gift occasion—the Remington Contour DeLuxe Electric Shaver. No other shaver or razor gives such smooth, fast, comfort-free shaves . . . even the toughest whiskers and hard [illegible]. In quality, in performance, and in styling, the Contour DeLuxe leads the field. It's an attractive, impressive looking gift he'll be proud to receive and you'll be proud to give. So, for the gift that lasts on giving pleasure and convenience, select the world's finest shaving instrument Remington Contour DeLuxe.

[illegible] quicker and [illegible]

DIAMOND-HONED

Remington

Contour

DE LUXE

ELECTRIC SHAVER

A product of ***Remington Rand***

[illegible] Shaver Department in [illegible] Your local telephone directory.

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Wherever you go . . . whatever you do . . . there is an Interwoven sock to fit in with your particular wardrobe requirement . . .

SPORT TYPE SOCKS IN A LARGE SELECTION OF PATTERNS NYLON WOOL MERCERIZED COTTON

KNIT A FEW OF INTERWOVEN'S FANCY LIGHT WEIGHT SOCKS IN PATTERNS AND COLORS NOW EXCLUSIVELY INTERWOVEN

NOW – a new Bell & Howell easy-loading movie camera for only $129.50

Never before a good Bell & Howell at this low price or at all! Uses 8mm film. • Easy-loading – no threading, no fumbling in the daylight. No threading to bother. • Low-cost operation. Uses inexpensive 8mm film. • Exclusive Bell & Howell precision viewfinder. What you see, you get. • Beautiful, streamlined design. • Wide variety of accessories for Bell & Howell 8mm cameras. • Complete with case, lens cap, film, lens tissue, instructions, electrical cord, and warranty card. Free lessons in transportation.

See your dealer today.

You buy wherever you see

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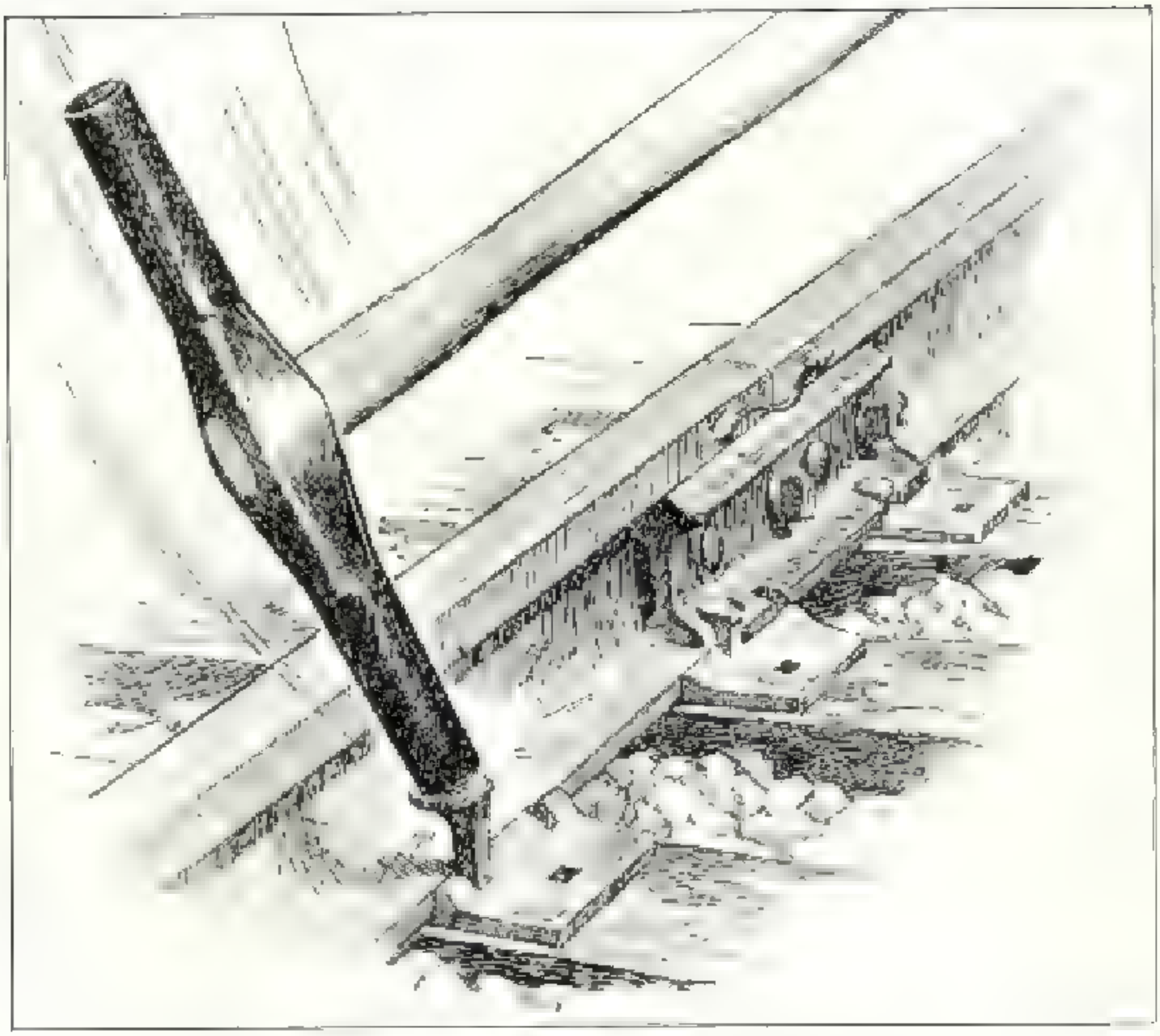
Manufacturers of Motion Picture Equipment



"George" doesn't do it for us!

Of all the forms of intercity commercial transportation, only the railroads do not say "let George do it."

Unlike their competitors, who have outgrown the "infant industry" stage and now seek no help from the public treasury, the railroads are still struggling, unassisted, against great odds for survival in business. And they need no "George."

For years, pick where you like, in Atlanta, Georgia, where freight and passenger traffic, waterways and highways that other carriers use, are a gift of taxpayers' money, the railroads have paid their own way in America.

But can they do it for us, Americans? The railroads need your help now, as the fundamental transportation of America as well. It isn't easy . . . [illegible] essentials where [illegible] to compete for business with subsidized carriers [illegible] your and your pocketbook. "George" [illegible] the [illegible] . . . keep private [illegible] . . . [illegible] independents self-reliant [illegible] of America's business [illegible].

Ernest E. Norris

President

SOUTHERN RAILWAY SYSTEM

WASHINGTON 13, D. C.

Today— **IT&T** *provides*

your finest home entertainment—TELEVISION

by

Capehart

You have never seen or heard television performance—at any price—comparable to the performance of these fine Capehart instruments. Incomparable Polaroscope picture—plus Capehart's incomparable Symphonic-Tone System—these are the great differences. International Telephone and Telegraph Corporation, through its associates, *Capehart-Farnsworth Corporation*, brings you the *finest* in home entertainment. See, hear Capehart—priced from $249.95* upward—before making your decision.

International Telephone and Telegraph Corporation, New York

Beautifully new as a sedan!

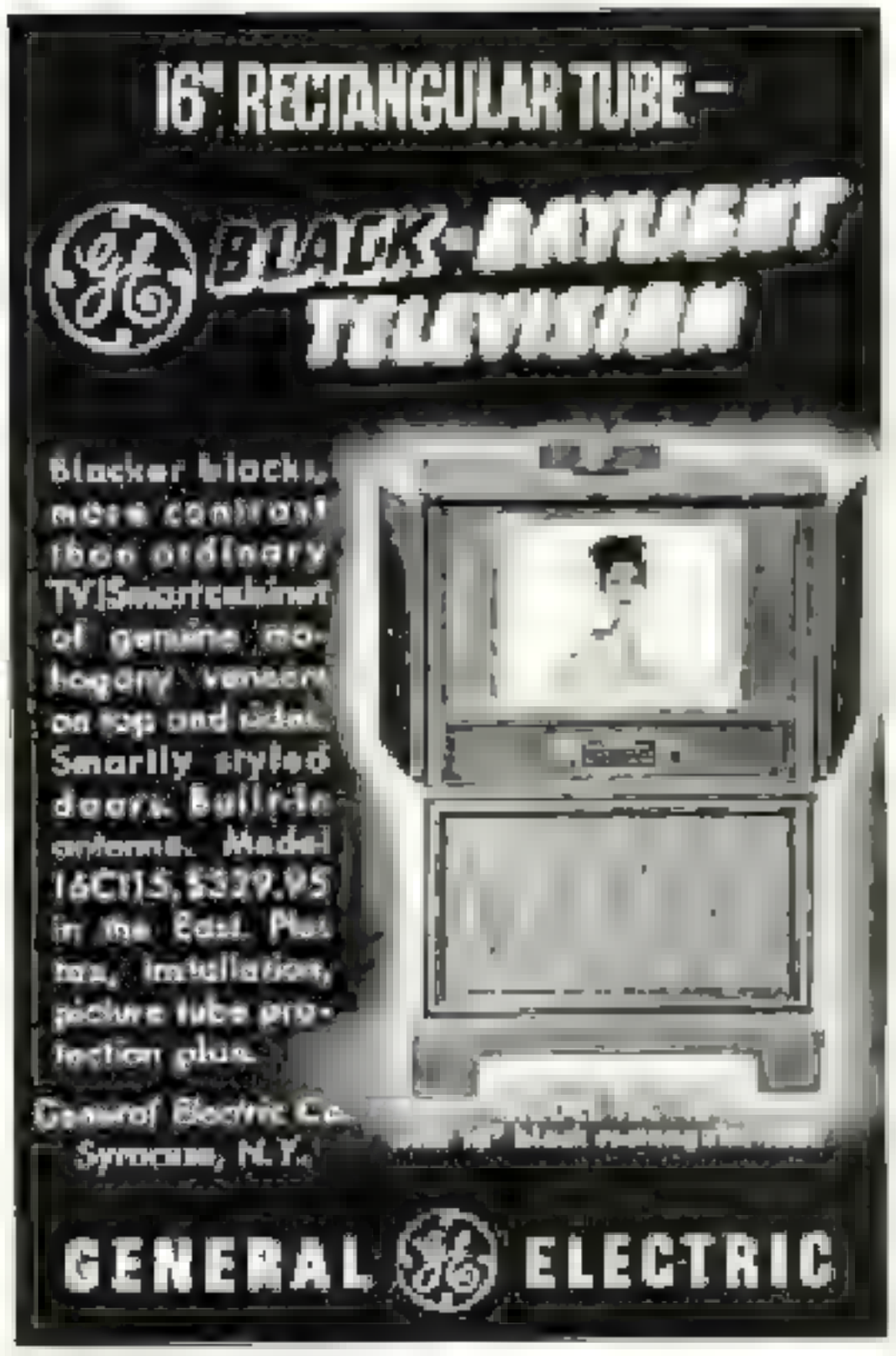
The NEW handcrafted 1951

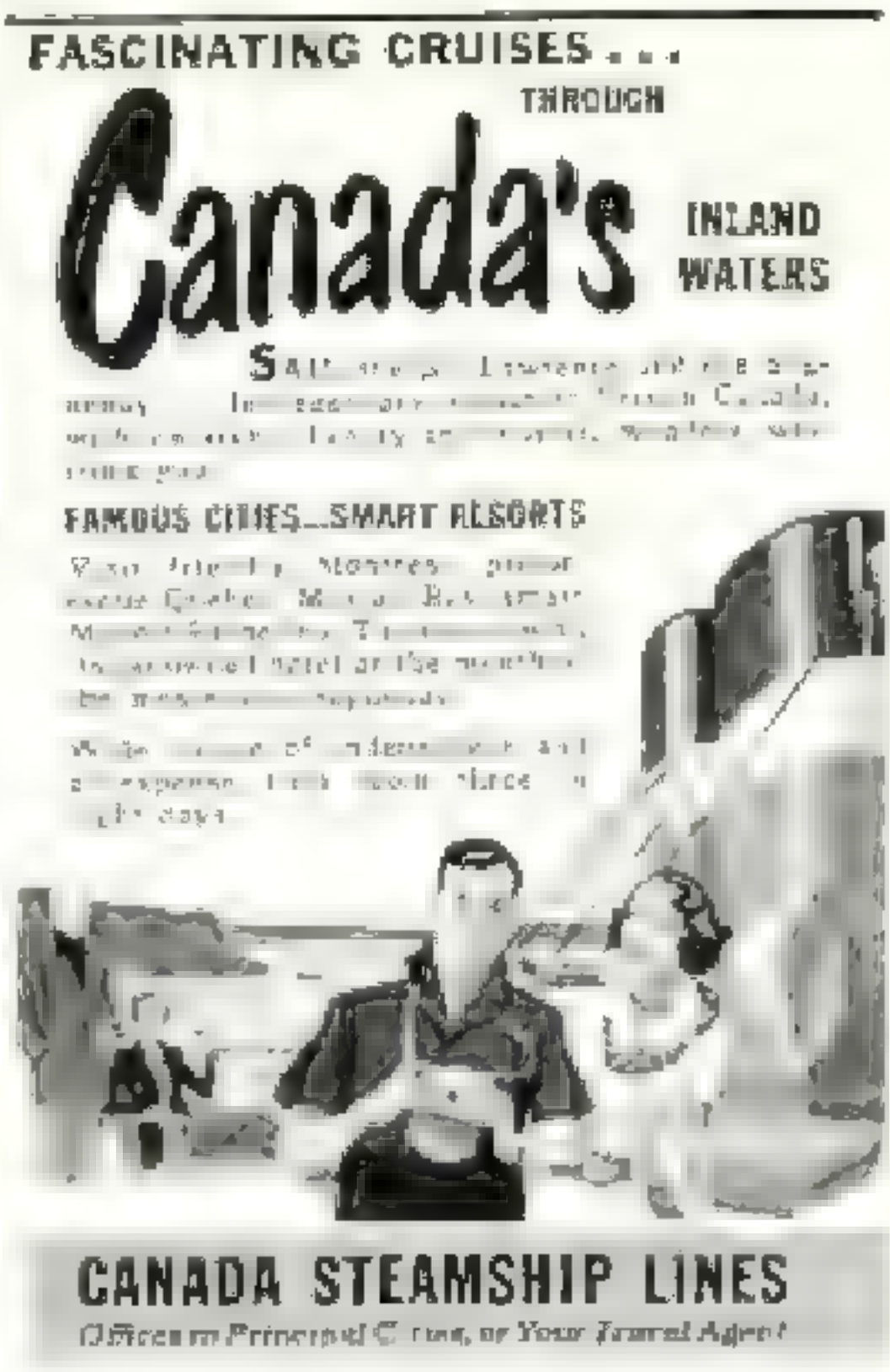
FRAZER

VAGABOND

The Pride of Willow Run


of all the places health the sun
in Ontario
you'll find more fun!
Ontario
ONTARIO TRAVEL,
85-A PARLIAMENT BUILDINGS,
TORONTO 2, ONTARIO


16" RECTANGULAR TUBE —
BLACK-DAYLIGHT TELEVISION
Blacker blacks, more contrast than ordinary TV! Smart cabinet of genuine mahogany veneers on top and sides. Smartly styled doors. Built-in antenna. Model 16C115, $329.95 in the East. Plus tax, installation, picture tube protection plus.
General Electric Co. Syracuse, N.Y.
GENERAL ELECTRIC

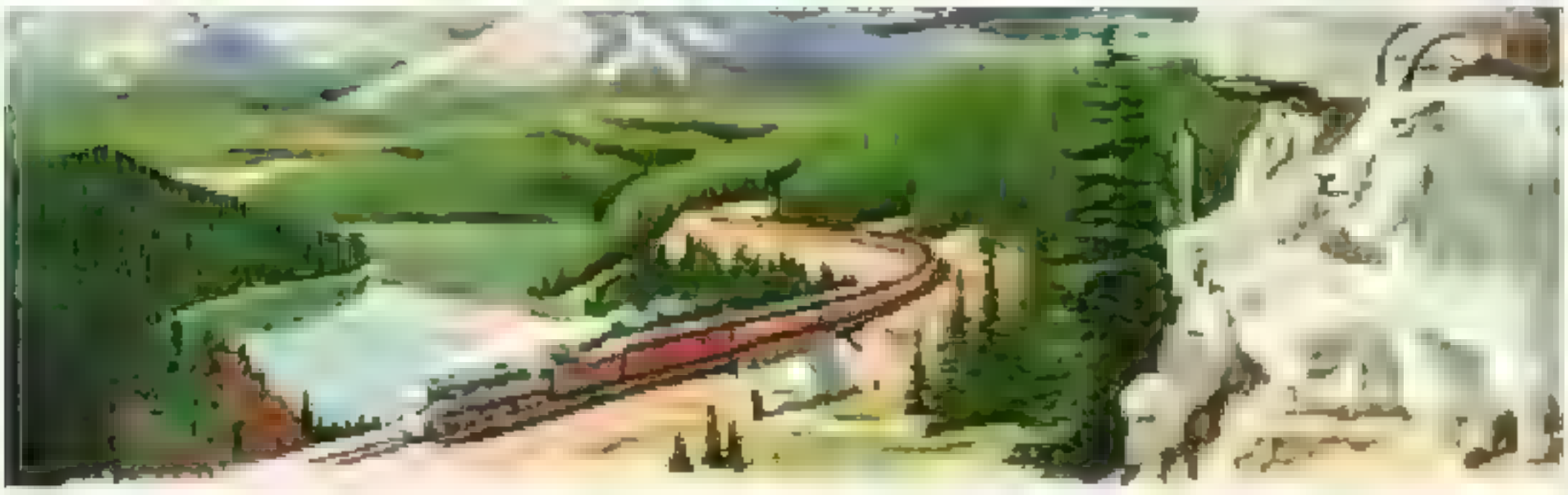

FASCINATING CRUISES . . .
THROUGH
Canada's INLAND WATERS
FAMOUS CITIES...SMART RESORTS
CANADA STEAMSHIP LINES
Offices in Principal Cities, or Your Travel Agent

Service round the globe — comfort round the clock

when you go — and stop —

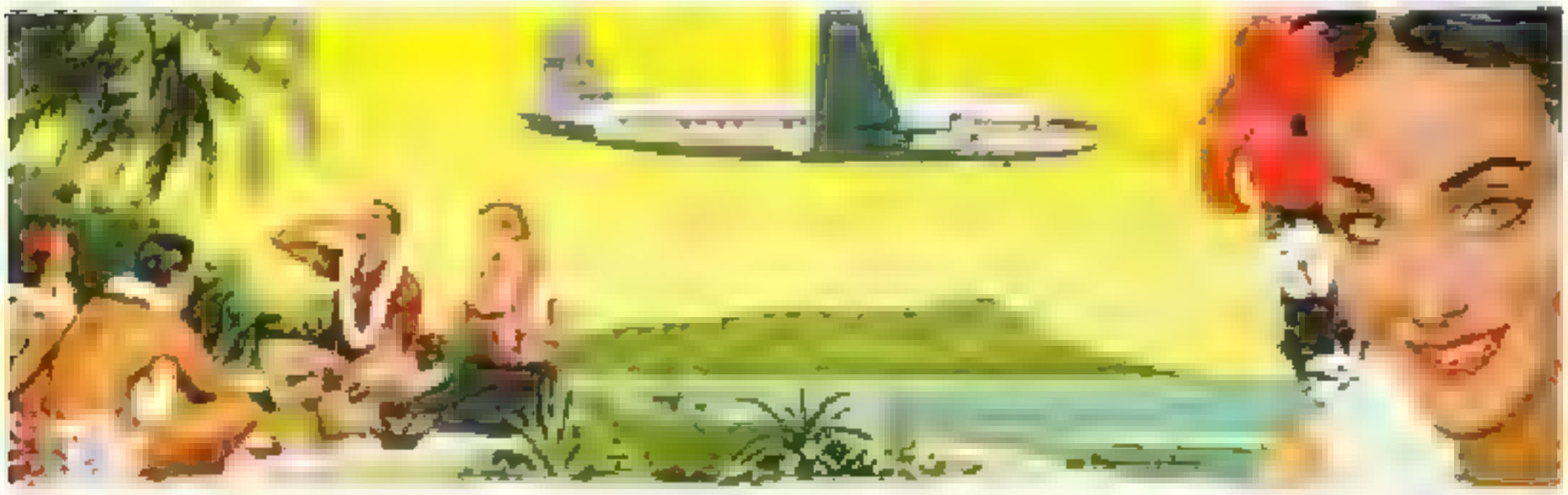
Canadian Pacific

Sail to Europe



See Canada's magnificent

Fly to New Zealand and Australia on Canadian Pacific's



Another great G-E first! General Electric's

ALNICO MAGNETIC DOOR!

No latches! No slam! Each door seals magnetically... closes easily, quietly!

HERE'S another G-E research achievement—a door for the Refrigerator-Home Freezer Combination with an Alnico Magnetic door that seals itself tight to prevent the loss of precious cold air.

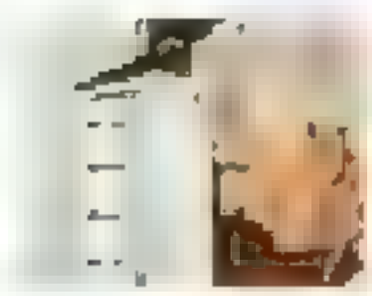
Why is this door so wonderful? The answer is in the door. Inside, pressed against a metal strip on the door, is a powerful magnet that is the door seal. They grip the door shut . . . seal it completely all the way around!

G-E Alnico magnets are permanent. They will last the lifetime of your refrigerator!

So dependable, too! More than 2,000,000 G-E Refrigerators are still performing faithfully after 10 long years. Many are now in their 15 and 20 years!

See your nearest G-E dealer. He's listed in your local yellow page directory, under General Electric Refrigerators.

A great G-E refrigerator, the right price. Convenient.



Watch the G-E Alnico Magnetic door close easily, quietly. The G-E model NHA-10[illegible], above, can now be more welcome . . . and more feature-packed! Temperature in the fresh-food section. The new freezer stores up to 70 pounds of frozen food.*

No more defrosting of the fresh-food section! Forget that weekly fuss! Frost just cannot accumulate in the compartment. Foods don't dry out either! Use a fresh-food-storage capacity equivalent to a standard 6 cu. ft. model!

NEW! REDI-CUBE ICE TRAYS

You pick cubes and [illegible] a General Electric exclusive!

NEW! VEGETABLE ROLLA-DRAWERS

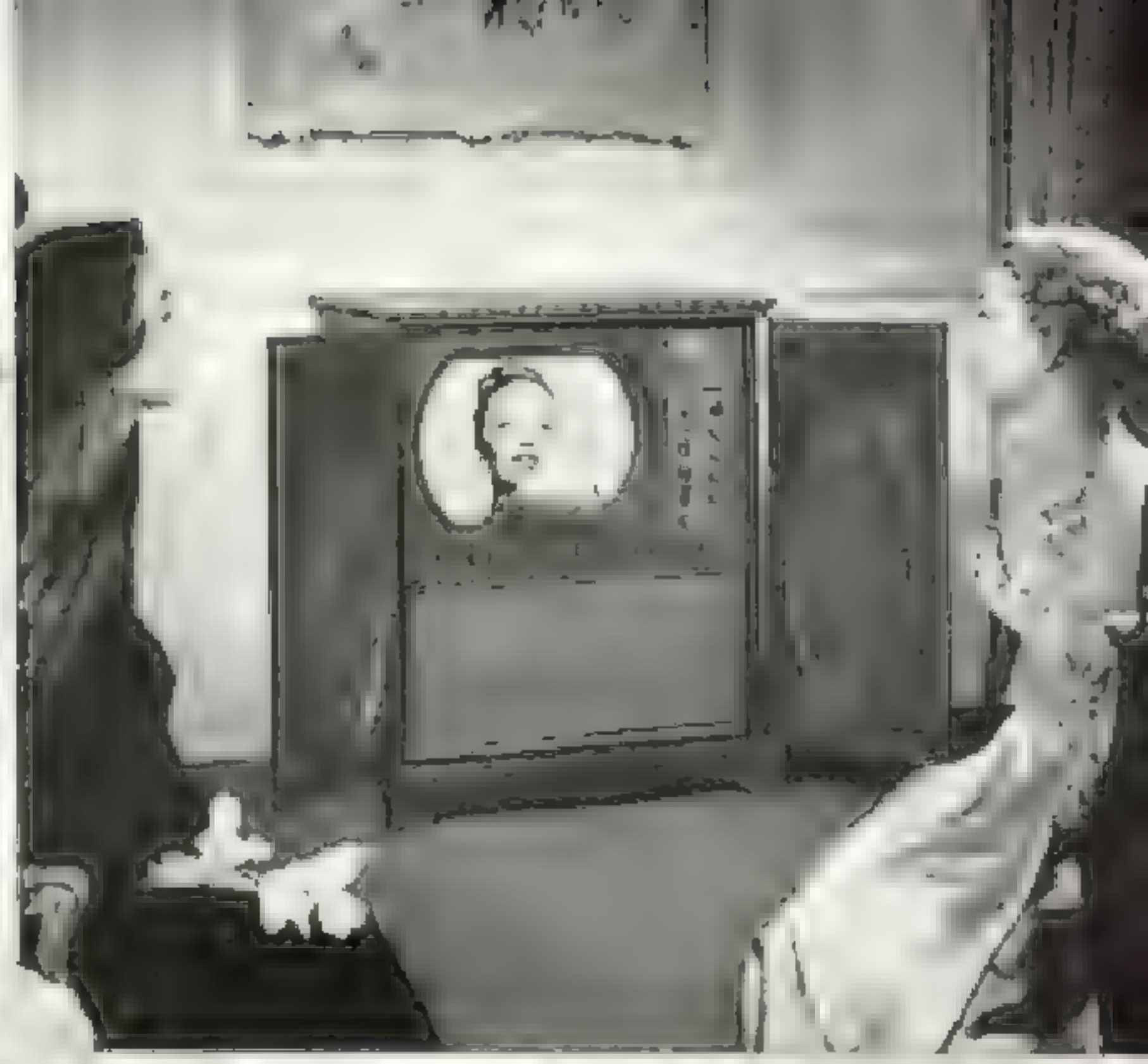
[illegible] quickly at a touch. No [illegible] or [illegible] to clean!

G-E REFRIGERATOR-HOME FREEZER COMBINATION

A separate Refrigerator plus a separate Home Freezer

You can put your confidence in—

GENERAL ELECTRIC



FROM THE TELEVISION LABORATORIES OF DUMONT

these superb new instruments

Fools with the finest in Television

DUMONT

[illegible]—It breathes so

Cool retreat from sweltering heat

[illegible]

[illegible]

AIR CONDITIONING **Carrier** REFRIGERATION

[illegible]

Wayward light is disciplined—**for better television!**

[illegible]

Their discovery that wandering light waves inside a picture tube—and inside the glass itself may cause halation and blur in images' edges. By coating the glass, the wayward flashes are absorbed so that only the light waves which actually make pictures can reach your eyes!

[illegible]

[illegible]

RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

Look what's attached to your Pullman ticket!

PEACE OF MIND

[illegible] know the [illegible] travel in Pullman [illegible] way it was is to get [illegible]

PRIVACY WHEN YOU WANT IT

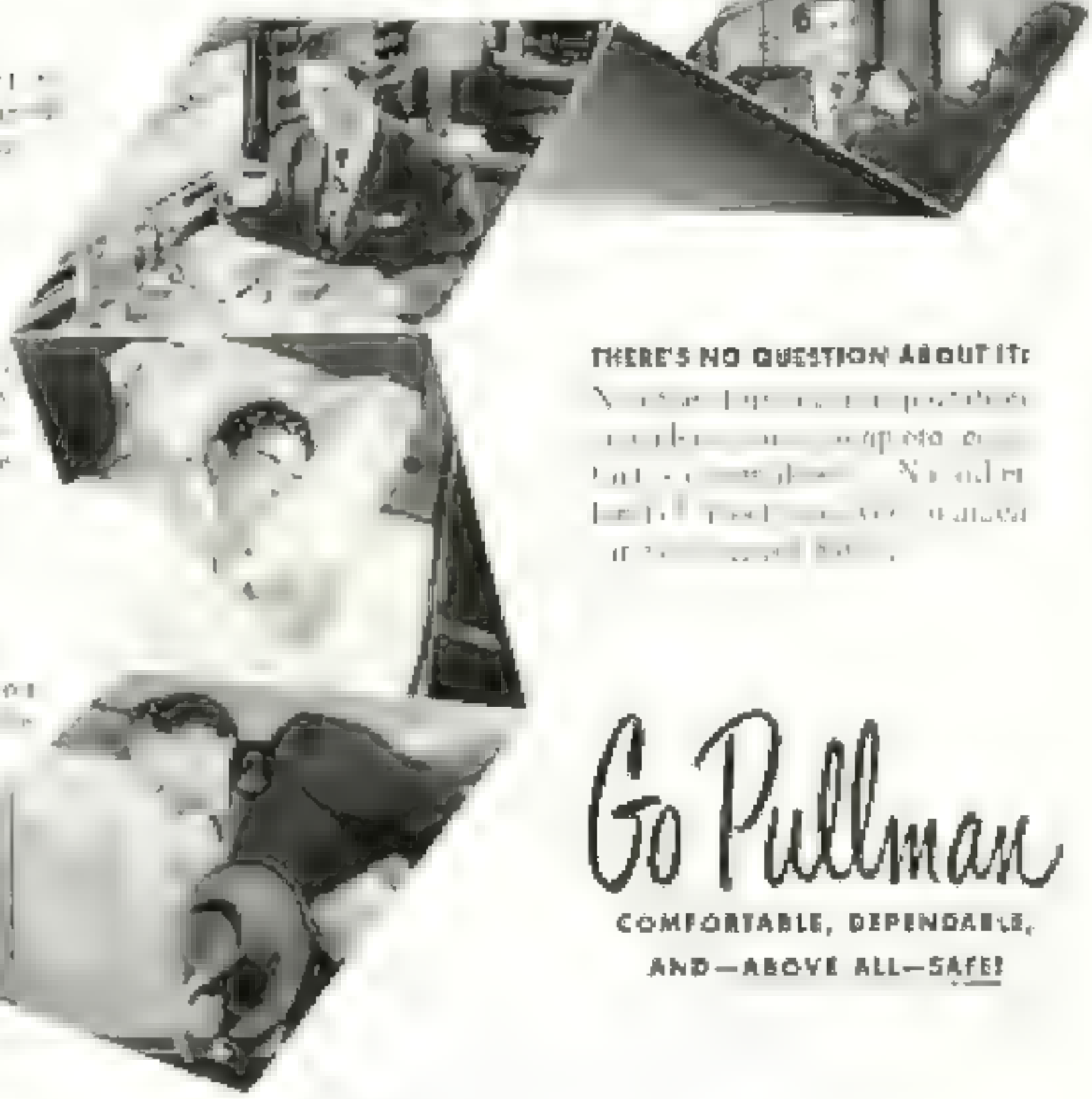
[illegible]

COMPANIONSHIP WHEN YOU WANT IT

[illegible]

FOOD AS YOU LIKE IT

You eat when you want [illegible] select the meal to suit your[illegible] in the railroad dining car[illegible]



A GOOD NIGHT'S SLEEP

[illegible]

THERE'S NO QUESTION ABOUT IT:

[illegible]

HEART-OF-TOWN STAY-CAT

[illegible]

Go Pullman

COMFORTABLE, DEPENDABLE, AND—ABOVE ALL—SAFE!

[illegible]

You'll have real fun IN PENNSYLVANIA!

[illegible] Resorts are all spruced up. Yes, throughout Pennsylvania, folks are hard at work so you can play.

And there's a whole calendar of exciting events coming up: dances, [illegible] tournaments, festivals, country fairs.

Come right now when hills and forests are at [illegible] freshest green, to make a date to spend the summer. You'll have real fun in the Poconos, at Eagles Mere in the Sullivan Highlands, Ligonier Valley, Erie, Conneaut Lake, Cambridge Springs, Wellsboro, Bedford, Bedford Springs, in the Northern Tier counties in the Blue Ridge Summit area everywhere in the Keystone State.

YOU'LL FIND MORE IN

Pennsylvania

JAMES H. DUFF
Governor

PENNSYLVANIA DEPARTMENT OF COMMERCE
SUITE 200, HARRISBURG, PA.

I want to know more about Pennsylvania Vacation Lands
Please send me your new free booklet

Name _____

Address _____

City _____ Zone _____ State _____

In frigid North or South seas sunny.
These handy cheques protect your money.

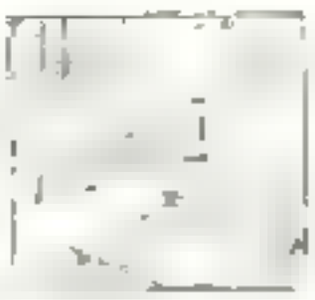
Always carry

BANK of AMERICA TRAVELERS CHEQUES

Issued by the world's largest bank, acceptable throughout the world. 75¢ per $100 at banks and travel offices everywhere.

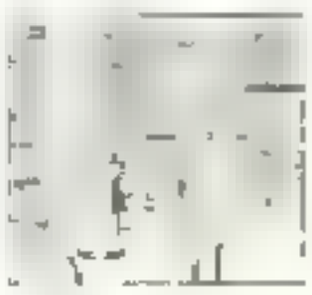
BANK OF AMERICA N. T. & S. A., CALIFORNIA
Member F. D. I. C.

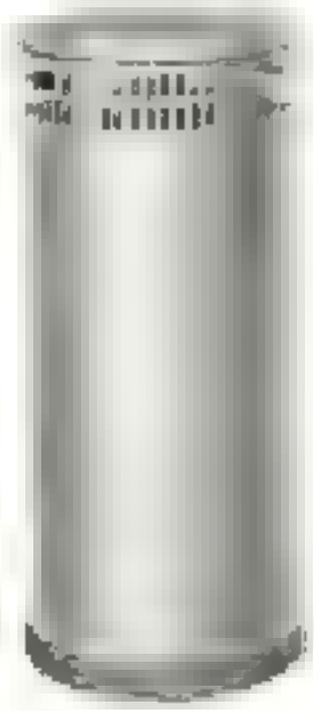
Remove Damaging Moisture — Electrically!



No messy chemicals. No muss or fuss. Automatic protection for

- Game Rooms
- Libraries
- Workshops
- Laundry Rooms
- Storage Rooms





[illegible] be amazed how this [illegible] removes moisture from the air [illegible]. It's inexpensive to run and easy to install. [illegible] your Frigidaire Dealer. Or write for [illegible] folder — Frigidaire Division of General Motors, 1414 Amelia St., Dayton 1, Ohio.

FRIGIDAIRE
Electric Dehumidifier

Have Yourself a SEE-LEVEL VACATION

...in air-cooled comfort and all-weather safety...
at New York Central's money-saving round-trip fares!

See exciting New York! Bona fide [illegible]

See the Adirondacks! [illegible]

See historic New England! [illegible]

See Niagara Falls and Canada! [illegible]

See Western Wonderlands! [illegible]

FREE ILLUSTRATED VACATION GUIDE

NEW YORK CENTRAL

The Scenic Water Level Route

Privacy as YOU like it on the Santa Fe

Room to Roam, too!

It's a private world of your own—your room on one of Santa Fe's great trains, whether it's a de Luxe suite or economical roomette.

When you feel like roaming, there's a lounge car for friendly relaxation . . . and at mealtime, you choose from a Fred Harvey menu and eat from a table, instead of a one-choice tray.

You board the Santa Fe downtown, not out in the sticks. You leave on schedule in any weather. See scenery and places en route at ground level...arrive safely, relaxed, refreshed. You deserve it out. You'll go Santa Fe [illegible]

Santa Fe

Ride great trains through a great country

Admiral

... exquisite in cabinet styling ...

with MAGIC MIRROR TELEVISION, engineered to outperform any set...

anywhere, any time ... TRIPLE PLAY PHONOGRAPH that plays all records

automatically, add FM-AM DYNAMAGIC RADIO, 12½, 16, 19 inch picture tubes ...

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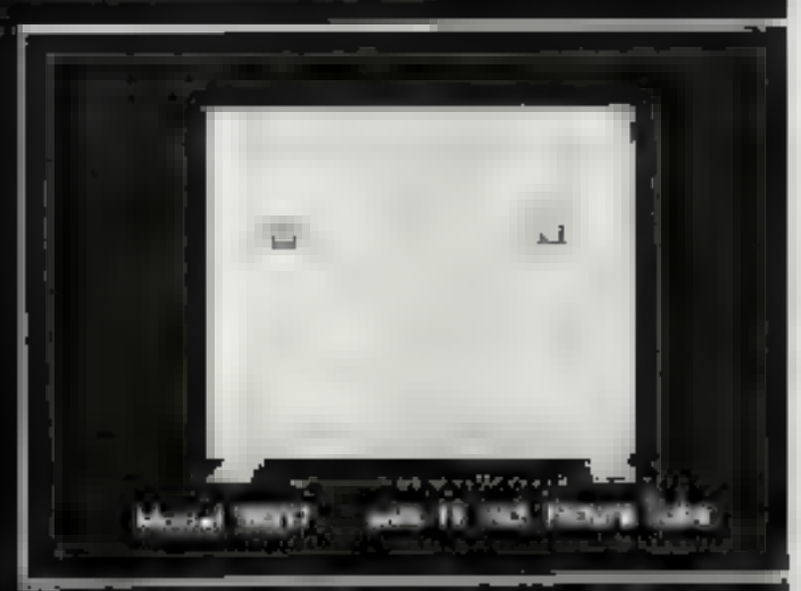

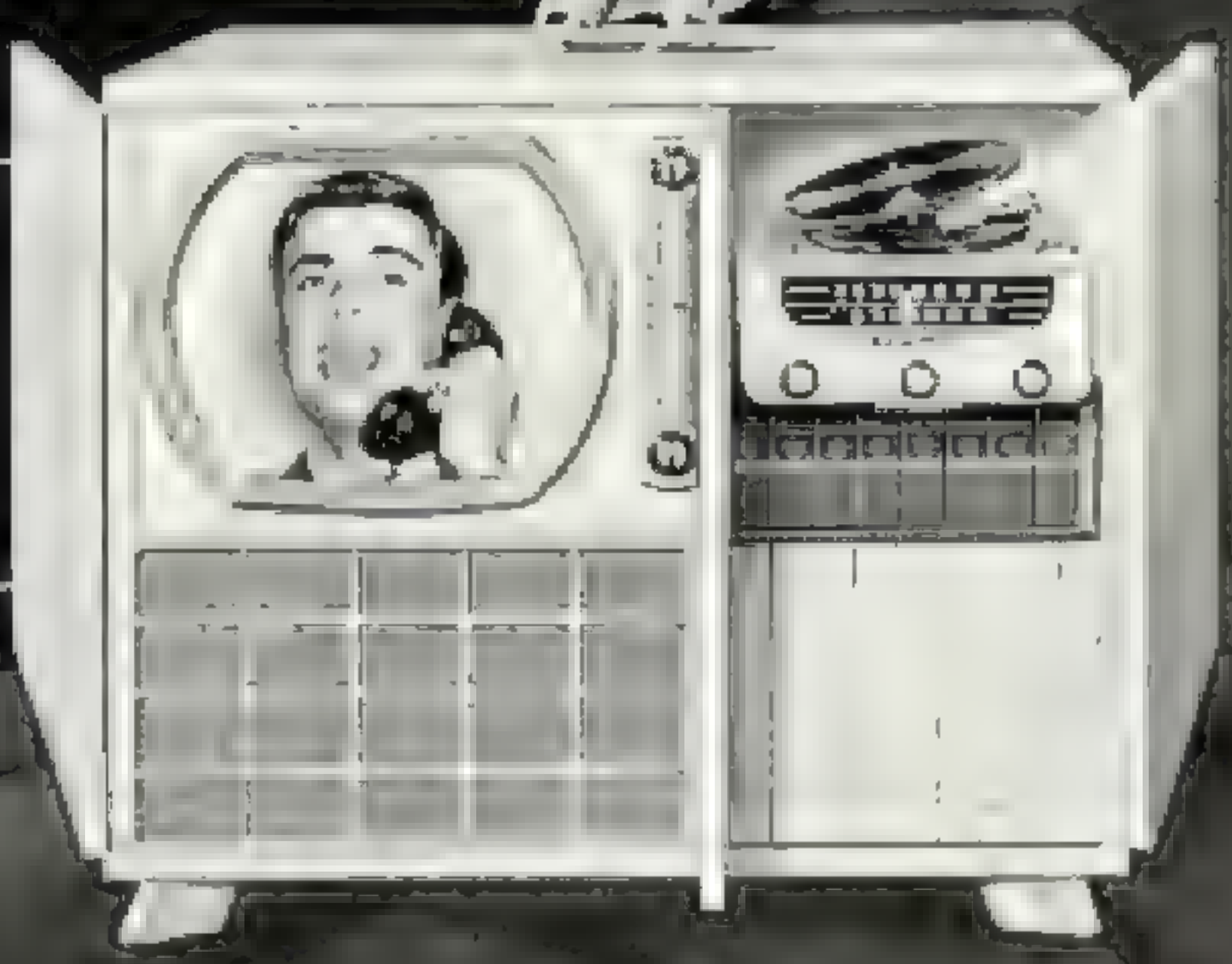

What to do . . . and what NOT to do . . . for

APPENDICITIS

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The Doctor says:

1. Appendicitis generally gives adequate warning—pain in the abdomen, sometimes accompanied by nausea, and usually settling after a time in the lower right side. Since the symptoms are not always the same, the usual rule is: *Call the doctor at once for any persistent pain in the abdomen.*

Just lie quietly . . .

2. If appendicitis is suspected, serious complications can often be avoided by keeping the patient quiet until the doctor comes. Sometimes the pain may lessen or vanish, but this is no sign that danger is past. Only a doctor, using a blood count or other tests, can determine if appendicitis is present.

No medicines . . .

3. The use of laxatives, enemas, or any external pressure, may cause the appendix to rupture, thus spreading the infection. That is why it is always safest not to give the patient any home remedies or medicines, and to avoid rubbing or pressing the area which is painful.

Nothing to eat

4. Food and liquids put an extra strain on an inflamed appendix and may also cause it to burst. So, the patient should not have anything to eat or drink, until the doctor has made an examination.

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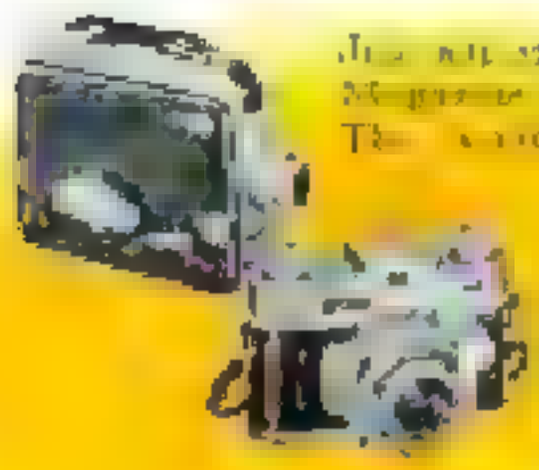

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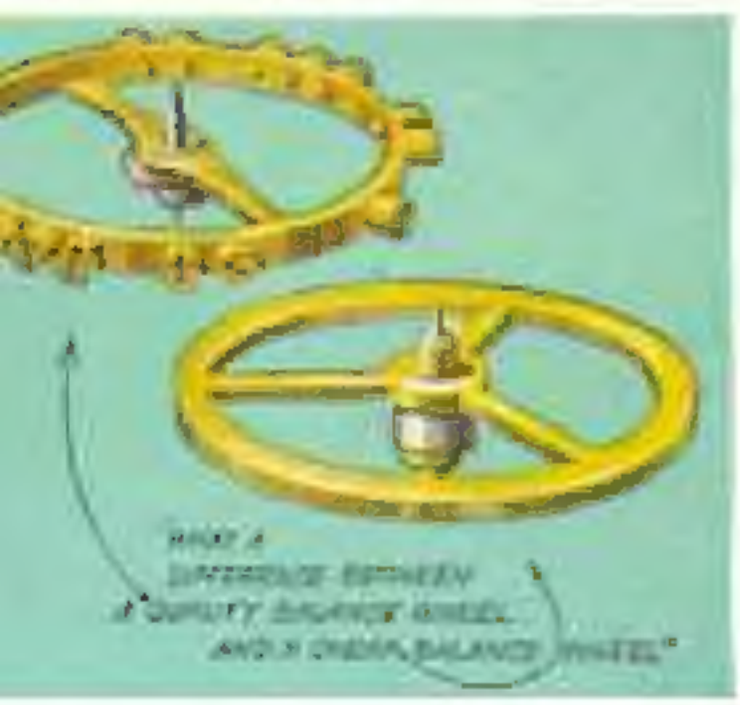

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